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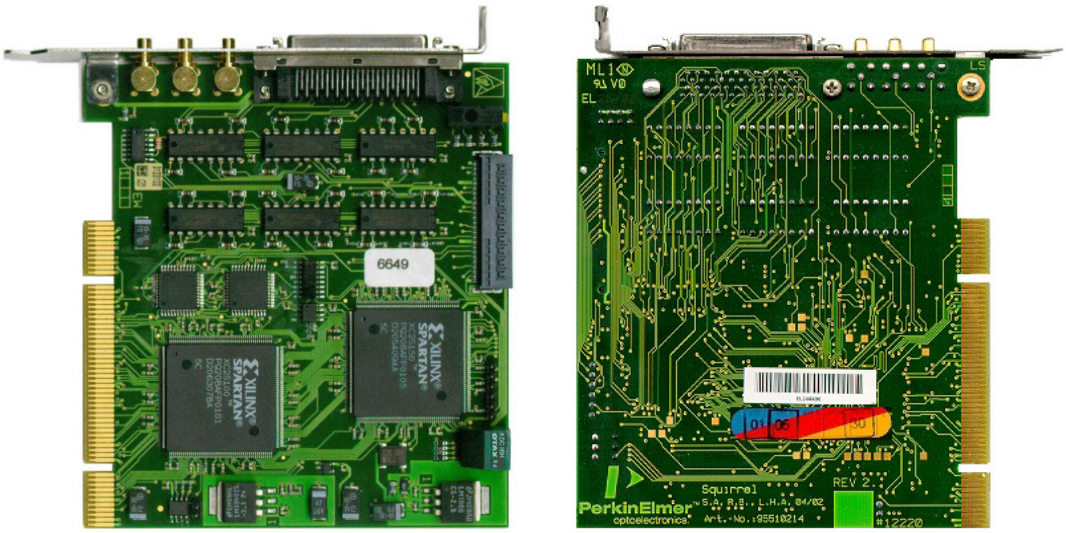
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Digital X-Ray Cameras - LAE

# LAE - Technical Notes

# SQUIRREL Frame Grabber

*LAE Technical Notes are intended to be used from our OEM's technical imaging specialists which have already an understanding of the RID behaviour and principal performance. The notes should help to supply the detector integration and to backup the specialist with additional information beyond the general information available in the RID description RID detectors.*

The **SQUIRREL** Frame Grabber is a customized designed PCI frame grabber card for controlling and acquiring 16 bit data of all PerkinElmer™ Radiation Imaging Detectors **(RID)** over the HIIB. The **SQUIRREL** is a standard sized PCI bus board and complies to the PCI 2.2 regulatory. The frame grabber drivers and the special RID software library (HSL) are delivered as DLLs for Windows®98/ME/NT4.0/2000/XP.




## 1 Technical Specification

The **SQUIRREL** Frame Grabber is a small sized PCI bus board. It contains a sophisticated bus-master DMA controller to transfer the data into memory, using scatter-gather DMA for linear storage even of image sequences. The transfer speed is determined mainly by the motherboard of the PC, since PCI transfers take place at 132 MB/s peak and 90 MB/s average. With a fast PCI-to-memory in the PCI chip set, 40 MB/s transfer rate can be expected meaning that the image transfer only slightly loads the PCI bus.

| Specifications | Squirrel |
|---|---|
| **Physical Dimension** | 120 mm x 107 mm (Small sized PCI board) |
| **PCI Compliant** | PCI 2.2 |
| **DMA** | Bus master |
| **DMA addressing** | Scatter–gather |
| **PCI-Power Supply (+/- 5%)** | 5 V, 0.5 A (typ.) 0.7 A (max)<br>3.3 V, 0.18 A (typ.) 0.2 A (max) |
| **PCI-Bus** | 32 bit 33 MHz |
| **Bandwidth (typical)** | > 80 MB/s |
| **Bandwidth (max.)** | 132 MB/s |

**Table 1 Frame Grabber Specification**



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## 2 Connectors

The connectors of the **SQUIRREL** PCI interface board interlink the RID 1620 detector to the personal computer. The female 50-PIN mini delta ribbon connector on the module can be used to plug in the HIIB cable. The module allows data acquisition via the parallel interface, camera mode control via the serial configuration bus and generation of external triggering. The two HIIB signals /FR_ENB and FR_SYNC are also externally connectable as TTL signals (SMB-Subclic connectors).

HIIB – Heimann Interface Bus
1 – /TRIG IN
2 – /FR_EN (Begin of frame)
3 – /FR_SYNC (Squirrel)

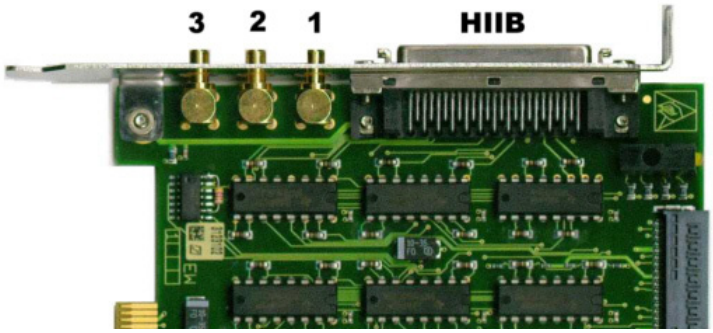



**Fig. 1 Frame Grabber Connectors**

## 3 Environmental Consideration

| | Transportation / Storage | Operation |
|---|---|---|
| **Ambient temperature** | -10° to +60°C | +0° to +40°C<br>( 2 m/s forced air cooling) |
| **Relative humidity** | 5% to 90% | 10% to 85% |

**Note**: No condensation

**Table 2 Environmental Considerations for the Frame Grabber**

## 4 HEIMANN SOFTWARE LIBRARY (HSL)

The **H**EIMANN **S**OFTWARE **L**IBRARY (**HSL**) is an 32-bit DLL for Win32 and can be used with the **SQUIRREL** drivers with the Operating Systems Windows® XP/2000/ME/98/NT4.0(SP4). The **HSL** allows the implementation of all necessary detector functions and their use into specific image processing software programs. The list below describes the meaning of a selection of important routines. The routines can be easily integrated in any modular programmed software. Their specific use is described in the HIS Reference Book.

| Command Module | Explanation |
|---|---|
| **Acquisition_Init** | Routine for general initialization of an RID and Frame Grabber. |
| **Acquisition_EnumSensors** | Enumerates all connected sensors |
| **Acquisition_GetNextSensor** | Iterates through all recognized sensors. |
| **Acquisition_Define_DestBuffers** | Definition of the required destination buffers for image capturing. |
| **Acquisition_Acquire_Image** | General routine to acquire images from the detector. |
| **Acquisition_Abort** | Stops image acquisition. |
| **Acquisition_Close** | Frees all resources allocated for image acquisition. |



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| | |
|---|---|
| **Acquisition_Acquire_OffsetImage** | Allows acquisition of an Offset image for a specific or for all available frame times. |
| **Acquisition_Acquire_GainImage** | Allows acquisition of a specific Gain image for a chosen frame time. |
| **Acquisition_DoOffsetCorrection** | Routine corrects an image automatically with the actual Offset image. |
| **Acquisition_DoGainCorrection** | Routine corrects an image automatically with the actual Gain image. |
| **Acquisition_DoPixelCorrection** | Routine for an automatic pixel-wise mean correction with the loaded PxlMask map. |
| **Acquisition_LoadPixelMap** | Load the map of defective pixels for Median correction. |
| **Acquisition_IsAcquiringData** | Checks if sensor is about to acquire images. |
| **Acquisition_GetIntTime** | Routine to detect the actual frame time automatically. |
| **Acquisition_SetReady** | Informs the HSL that image drawing is ready. If not ready a warning message is generated by HSL. |
| **Acquisition_GetReady** | Informs the user if image drawing is ready. |
| **Acquisition_GetErrorCode** | If any of the HSL function returns with an error, extended information can be obtained. |
| **Acquisition_GetConfiguration** | Retrieves the current configuration setting of the HSL. |
| **Acquisition_SetCameraMode** | Allows setting of camera frame time. |
| **Acquisition_GetWinHandle** | Returns the currently set acquisition window handle (mostly main window). |
| **Acquisition_GetActFrames** | Current acquisition frame. |
| **Acquisition_GetAcqType** | Returns the currently used acquisition mode (single image, sequence, continuous, average and so on). |

**Table 3 List of HSL modules**



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