

# SciChart: Integration into Logic Analyzer Application

## Customer

JKI

## Notes

Performed as consultancy project.

## Industry

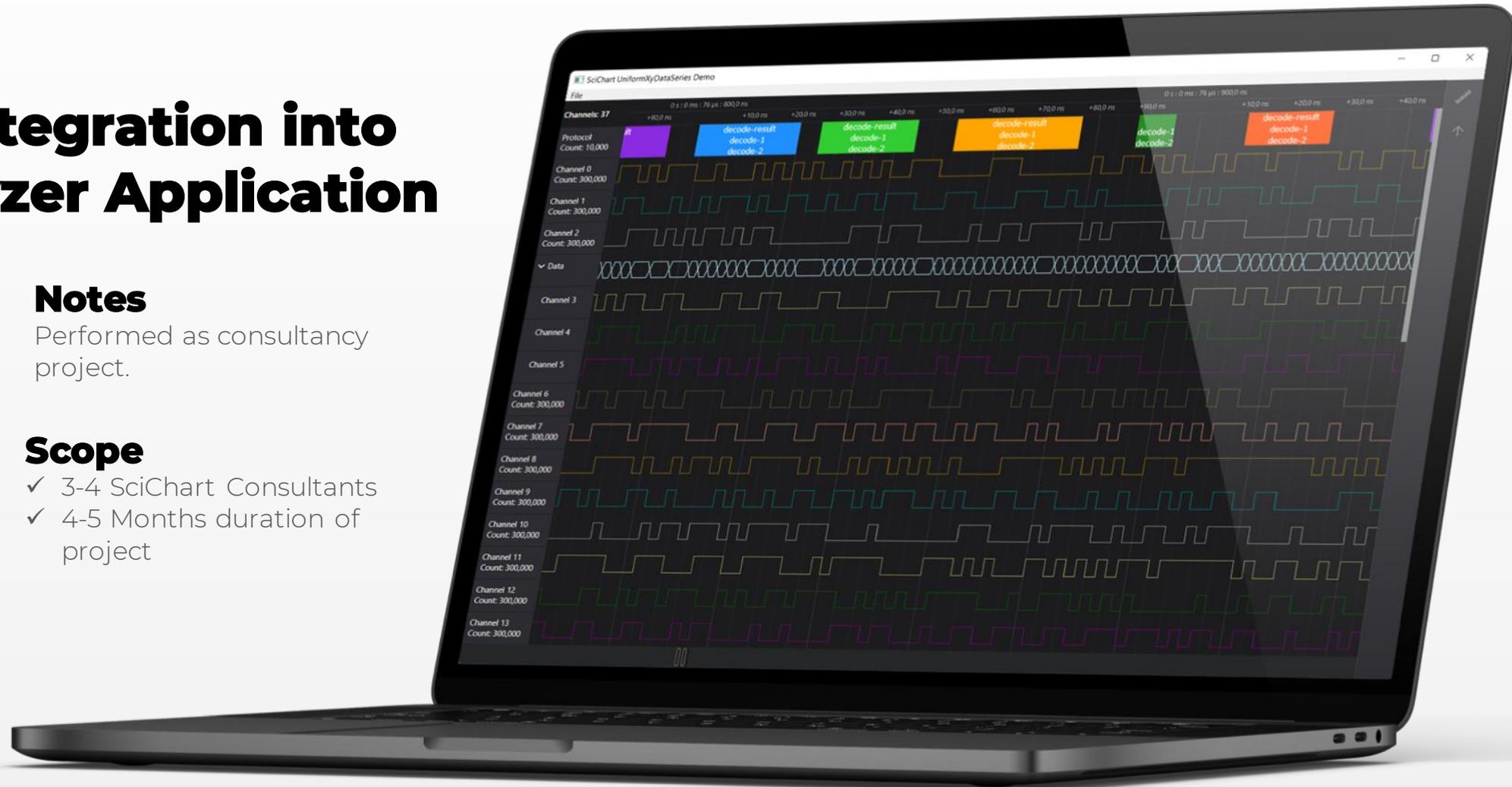
Electronics,  
Semiconductor

## Scope

- ✓ 3-4 SciChart Consultants
- ✓ 4-5 Months duration of project

## Skills Involved

WPF



## About JKI

JKI is a leading electronic test and measurement company. Founded by Jongkoo Kang who has over 25 years' experience in testing and designing semiconductor devices and equipment's.

JKI provides high speed trace and test verification tools for cutting-edge memory technologies.

**SciChart provided a chart that was more beautiful and performed better than the chart developed by us.**

## The Challenge

JKI needed a powerful data visualization charting tool to meet the performance requirements of their Protocol Logic Analyzer software, and a high-performance charting component that is fast enough to visualize big chunks of data was essential.

Files were in terabytes (hundreds of billions of data points). The application needed to be highly performant enough to render billions of data points, and a double-scale XAxis capable of showing nanoseconds data was required.

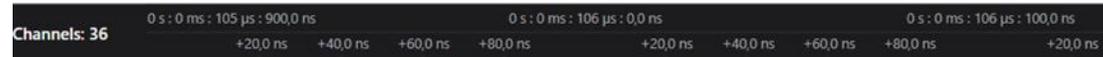
The application also needed to have the ability to interact with charts fast when zooming, panning, and interacting with annotations, and the creation of chart buses in real-time from multiple channels with billions of points at reasonably fast rates.

In addition, the design interface needed to be modern style and flexible, and a scroll bar was required to navigate the entire file and data memory to show the zooming level and absolute time position.

## Custom SciChart features

Custom features were required by JKI. These included:

Custom X-Axis type – SciChart built a specific custom for JKI - Double-scaled time axis.



Two axis are bounded in one axis. The top bar shows the major tick values, and the bottom bar shows minor tick values.

The bottom bar is used for more clear and more detailed feel of where we are at – a clarification of analysing data.

“ We have solved problems that are difficult to solve with basic programming knowledge, and by adding this software to our products, we can increase the value of our products.

## Custom series types

- ✓ **DataSeries:** SciChart used `UniformXyDataSeries` custom type.
- ✓ **The `UniformXyDataSeries`** is a `DataSeries` type in SciChart that doesn't require X-Values. The X positions are instead calculated based on `XStart` and `XStep` properties – giving the `UniformXyDataSeries` an advantage over other `DataSeries` types in terms of allocated memory and data processing speed.
- ✓ **RenderableSeries:** SciChart implemented two special types of series called `ProtocolChart`, and `Bus Chart`.
- ✓ **Protocol chart** – This shows events in a period of time. Drawing visual representation (multiple rectangles, and text labels) with high performance, and good memory usage.

## Custom SciChart features (Part 2)

**Bus Chart** – This allows for grouping signals together.

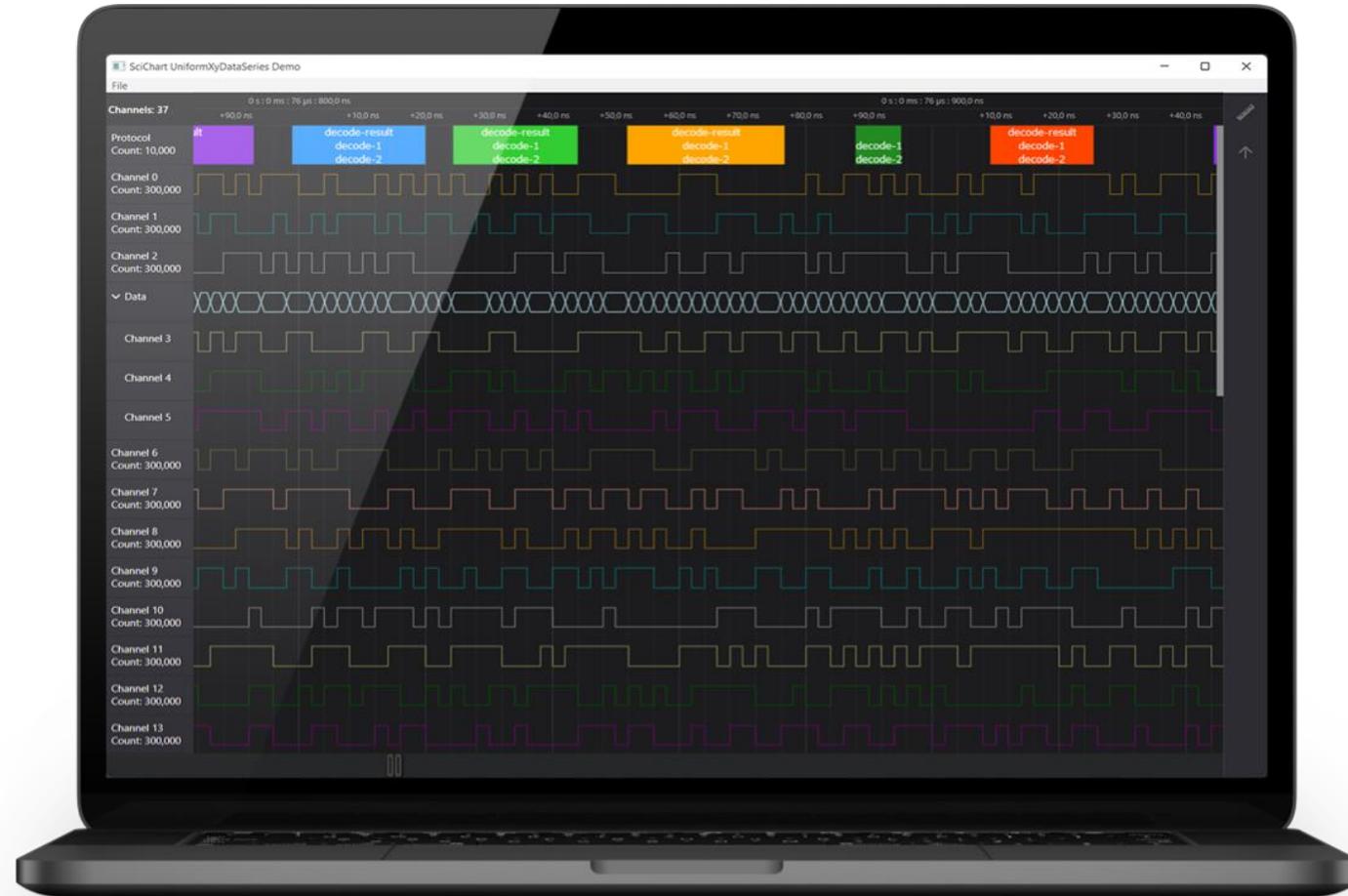
With Bus Chart, JKI can ungroup and add more channels, change the format on the labels inside the series, change colour, and the type (decimal or binary) of data represented inside the grouped channel. By default, text rendering is heavy and slow in WPF, and it had a negative impact on the application performance.

However, SciChart met JKI's needs and goals by dramatically improving the performance. In addition, another challenge JKI had was panning and zooming charts on a certain level when a text is visible. Panning wasn't as smooth as they wanted.

To JKI's satisfaction, SciChart improved the performance on panning and zooming when text is visible. Furthermore, SciChart implemented specific logic for finding intersections of multiple inner signals and drawing those intersections without loss in performance.

Inside bus channel, which is implemented as custom RenderableSeries, is a multiplication between intersections and calculated on a spot simultaneously with finding alterations..

The Bus Chart is a unique functionality. It's a special requirement and created specifically for JKI.

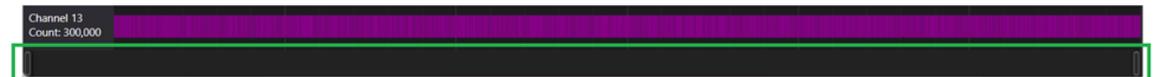


## Custom SciChart features (Part 3)

### Viewport Navigation

This was another functionality requested by JKI - a challenging work to carry out. It included:

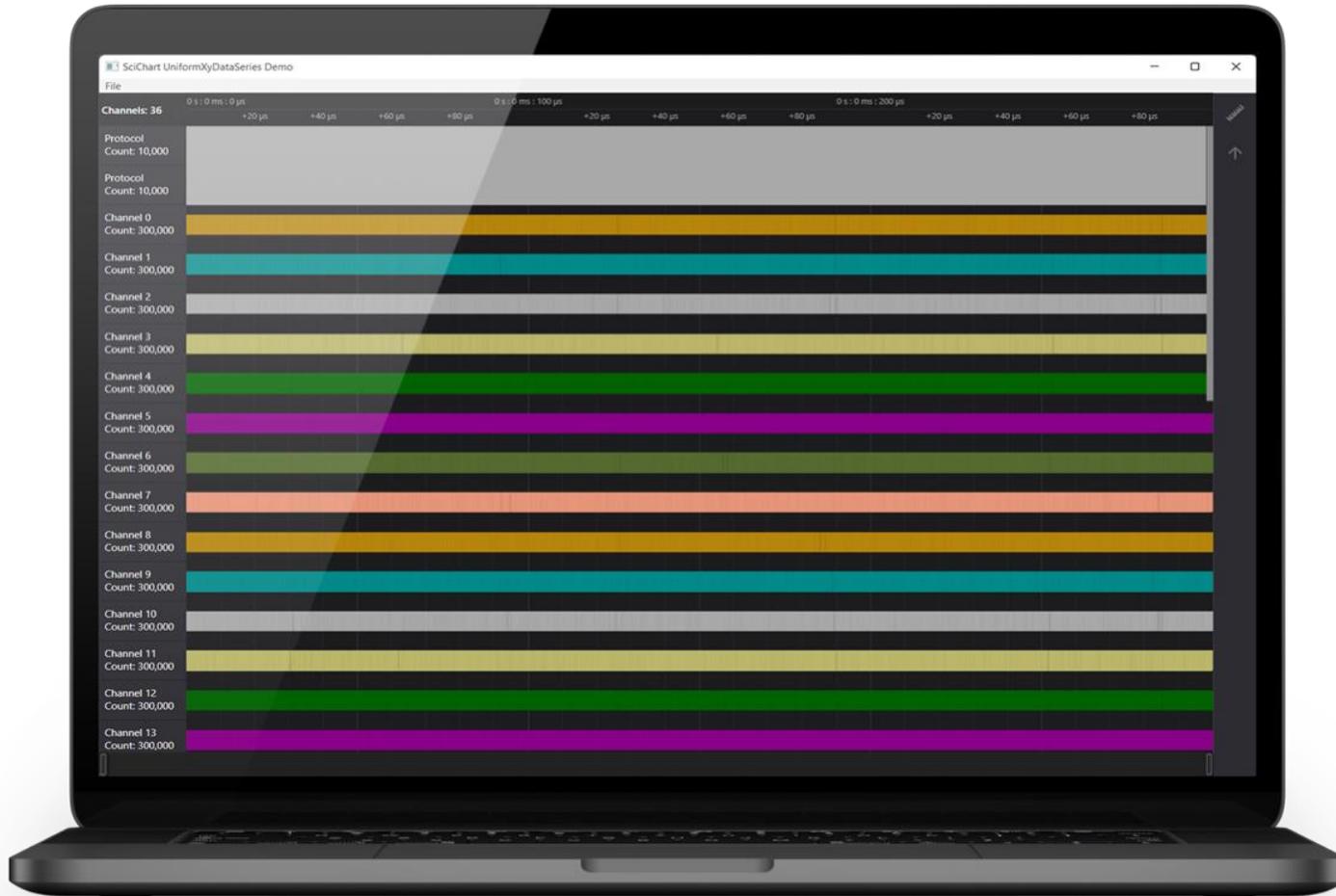
- ✓ Rubber Band Zooming and Panning
- ✓ Zoom Extents
- ✓ Vertical Scrolling
- ✓ Changing X-Range, Horizontal Scrolling (Overview Control at the bottom)



### Re-ordering Channels

Having the ability to re-order channels is another feature request from JKI.

With this feature, you can drag and drop channels with visual feedback. Channels can be re-ordered.



## Custom SciChart features (Part 4)

SciChart also provided further custom features requested by JKI. These included: Measurements & Annotations.

### Measurement Features:

- Adding measurement
- Sticking to the signal alterations
- Customization (Comment, Colour, Tooltips)
- Selection behaviour (list and viewport)
- Interaction behaviour (dragging, bring into view, zoom in based on measurement range)
- Visual feedback when creating timing markers

### Annotations Features:

- Adding single timing marker
- Adding pair timing marker
- Sticking to the signal alterations
- Customization (Comment, Colour, Tooltips)
- Selection behaviour
- Interaction behaviour
- Visual feedback when creating timing markers

# Client Feedback

“By running the demo program that is provided online, we have checked the feasibility, and when we contacted SciChart and asked for development, they confirmed it very quickly.”

“SciChart provided a solution that could draw billions of data points while minimizing the computer's resources, and provided customized charts and annotations.”



## About SciChart

SciChart is a cross-platform WPF, iOS, Android and Xamarin Scientific & Financial Charting Library.

SciChart supports rendering of complex, interactive, real-time charts with many millions of data points for demanding scientific, medical and financial applications and embedded systems that require high performance, rich interaction and smooth updates.

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