

```
// src/demo/EncoderDemo.tsx
```

```
import React, { useState } from "react";
```

```
import {
```

```
  encodeTextToLetters,
```

```
  encodeLettersToWavelengths,
```

```
  getAlphabetMap,
```

```
} from "../codec/textEncoder";
```

```
import { encodeLettersToFrames } from "../codec/  
frameEncoder";
```

```
import type { WnspFrame } from "../protocol/frameTypes";
```

```
export const EncoderDemo: React.FC = () => {
```

```
  const [input, setInput] = useState("HELLO NEXUS");
```

```
  const [letters, setLetters] = useState<string[]>([]);
```

```
  const [wavelengths, setWavelengths] =
```

```
  useState<number[]>([]);
```

```
  const [frames, setFrames] = useState<WnspFrame[]>([]);
```

```
  const alphabet = getAlphabetMap();
```

```
  const handleEncode = () => {
```

```
    const ltrs = encodeTextToLetters(input);
```

```
    const wls = encodeLettersToWavelengths(ltrs);
```

```
    const frs = encodeLettersToFrames(ltrs);
```

```
    setLetters(ltrs);
```

```
    setWavelengths(wls);
```

```
    setFrames(frs);
```

```
  };
```

```
return (  
  <div style={{ padding: "1rem", border: "1px solid #444",  
borderRadius: 8 }}>  
    <h2>Encoder Demo</h2>  
    <label>  
      Message:  
      <input  
        style={{  
          width: "100%",  
          padding: "0.5rem",  
          marginTop: "0.25rem",  
          marginBottom: "0.5rem",  
        }}  
        value={input}  
        onChange={(e) => setInput(e.target.value)}  
      />  
    </label>  
    <button onClick={handleEncode} style={{ padding:  
"0.5rem 1rem" }}>  
      Encode  
    </button>  
  
    <div style={{ marginTop: "1rem" }}>  
      <h3>Letters</h3>  
      <p>{letters.join(" ") || "(none)}</p>  
    </div>  
  
    <div style={{ marginTop: "1rem" }}>  
      <h3>Wavelengths (nm)</h3>
```

```
<p>{wavelengths.join(", ") || "(none)}</p>
</div>
```

```
<div style={{ marginTop: "1rem" }}>
  <h3>Frames</h3>
  <pre
    style={{
      maxHeight: 200,
      overflow: "auto",
      background: "#111",
      padding: "0.5rem",
    }}
  >
    {frames.length ? JSON.stringify(frames, null, 2) :
"(none)"}
  </pre>
</div>
```

```
<div style={{ marginTop: "1rem" }}>
  <h3>Alphabet Map</h3>
  <div style={{ display: "flex", flexWrap: "wrap", gap:
"0.5rem" }}>
    {alphabet.map((symbol) => (
      <div
        key={symbol.letter}
        style={{
          borderRadius: 4,
          border: "1px solid #333",
          padding: "0.25rem 0.5rem",
          minWidth: 50,
```

```

        textAlign: "center",
    }}
>
<div
  style={{
    width: 24,
    height: 12,
    margin: "0 auto 0.25rem",
    background: symbol.hexColor,
  }}
/>
<div>{symbol.letter}</div>
<div style={{ fontSize: 10 }}>{symbol.wavelengthNm}
nm</div>
</div>
)}}
</div>
</div>
</div>
);
};

```