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// src/demo/EncoderDemo.tsx
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```
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,
        }}}
      >
        {symbol.letter}
      </div>
    ))}
  </div>
</div>
```

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    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>
);
};
```