Computer Systems, Inc.
MERCURY

FM3TR Waveform Audio Mode

FM3TR Waveform Reference Implementation

SDR Forum Contract

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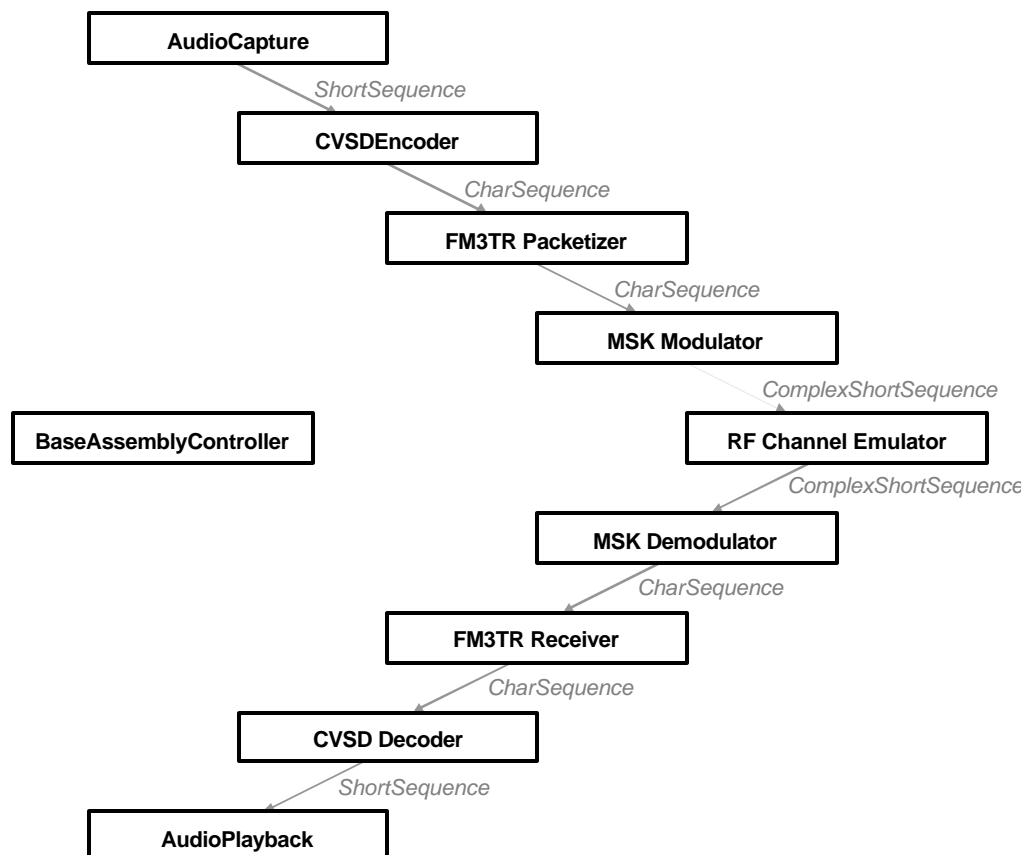
Revision 1.0

Table of Contents

1 Waveform Name

FM3TR_Audio

2 Waveform Processing Summary

The audio waveform encodes an audio signal from the sound card, usually recorded with an external microphone, into bits which are packetized and then modulated through an RF channel. The received signal is demodulated and decoded with the resulting audio signal being pushed to the sound card for playback through external speakers.

3 Waveform Block Diagram

The figure below depicts the component connections within the audio waveform. Not shown are the connections from the BaseAssemblyController to the resource ports on all other components.

```
      ┌──────────────────┐
      │   AudioCapture   │
      └──────────────────┘
              ShortSequence
         ┌──────────────────┐
         │   CVSDEncoder    │
         └──────────────────┘
                 CharSequence
            ┌──────────────────┐
            │  FM3TR Packetizer │
            └──────────────────┘
                    CharSequence
               ┌──────────────────┐
               │   MSK Modulator  │
               └──────────────────┘
                       ComplexShortSequence
┌───────────────────────┐   ┌──────────────────────┐
│ BaseAssemblyController │   │  RF Channel Emulator │
└───────────────────────┘   └──────────────────────┘
                               ComplexShortSequence
                    ┌──────────────────┐
                    │  MSK Demodulator │
                    └──────────────────┘
                            CharSequence
               ┌──────────────────┐
               │  FM3TR Receiver  │
               └──────────────────┘
                       CharSequence
          ┌──────────────────┐
          │   CVSD Decoder   │
          └──────────────────┘
                  ShortSequence
      ┌──────────────────┐
      │  AudioPlayback   │
      └──────────────────┘
```

4 Waveform Components List

Component	Brief Functional Description
BaseAssemblyController	Connects to resource ports on all components and invokes the start() method on each. It is the assembly controller for the entire waveform.
AudioCapture	Captures audio samples (ShortSequence) from the sound card
CVSDEncoder	Encodes audio samples into binary data (one bit per sample)
FM3TREncoder	Packetizer for framing data. Runs in "voice" mode.
MSKModulator	Modulates bits into a complex baseband signal.
RFChannelEmulator	Adds channel noise to complex baseband signal.
MSKDemodulator	Demodulates complex baseband signal into bits.
FM3TRDecoder	Extracts data bits from encoded frames
CVSDDecoder	Decodes data bits into audio signal
AudioPlayback	Plays audio signal through sound card, speakers.

5 Waveform Assembly Level SCA Properties

The waveform contains no property overrides.

6 Waveform Model Graphical Representation