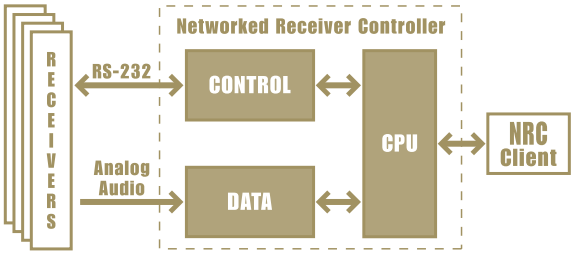
NRC

Networked Receiver Controller



Description

The Network Receiver Controller (NRC) is a single node network device capable of:

- Simultaneously interfacing with and processing data from up to 8 analog-output receivers.
  Specifically the NRC:
  - controls and configures each receiver via an RS-232 connection.
  - captures and digitizes the analog audio output from each receiver.
  - formats and routes the digitized audio signal to one or more attached network clients.
- Managing NRC client communications to and from the desired receivers.

The NRC represents the server portion of a network-based client/server architecture. NRC clients connect with the NRC using a simple socket-based protocol over an ethernet connection. When connected, a client has the ability to control, configure, capture and distribute the receiver's digitized audio signal.

The NRC focuses on digitizing and processing the receiver's analog audio channel signal. Other non-receiver analog signal interfaces can also be developed to make custom data payloads available to network clients.

The default NRC settings present the receiver's analog audio signal as a digitized 4KHz band-limited, 8KSample/sec signal to connected NRC clients. NRC clients can adjust attributes of the output captured digital audio signal, including the output sample rate, whether filtering is enabled, packet time-stamping, the number of data samples forwarded to the client in a single packet, and how to deal with the data stream during retunes.

Capabilities

Receiver Controllable Settings

- Frequency
- Detection Mode
- IF Bandwidth
- AGC mode
- BFO
- Reset / Reboot
- Pass native commands to the receiver
  - By-pass the generic receiver interface and send receiver proprietary commands to the receiver
- Receiver Memory Interface Support
  - Save, recall and query receiver configuration memory settings.

Remote NRC System Monitoring

- View current state of receiver configurations and attached clients
- View health and well being of NRC

Receiver Channel POST

- A power on self test is used to verify each receiver's RS-232 control and audio signal paths to reduce the possibility of incorrectly connecting receiver cables

Network Time Protocol (NTP) Client

- The NRC is configurable to obtain and synchronize time with an NTP server.

Output Options

• Sampling Rate:	8KHz (default),	16KHz
• Filtering:	4KHz LPF (default),	None
• Samples/Data Packet:	640 (default),	128-4096
• Packet Time Stamp:	None (default),	TAI64N
• Retune Samples skipped:	350 (default),	variable
• Collection Control:	Start / Stop	

Client Connection Options

- Up to 64 simultaneous client connections
- Primary – connection to a receiver when it is free
  - Full control and access to the receiver, the audio data and its configuration options.
- Piggyback – connection to a receiver that already has a Primary client attached
  - Limited connection privileges
  - No control of the receiver but visibility of the receiver's settings.
  - Full access to the receiver's audio configuration and data options.
  - Can be promoted to Primary connection status if the existing Primary client disconnects

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Receiver Abstraction

The NRC architecture abstracts the user from each of the receiver's proprietary low-level communications protocol by providing a common logical tasking interface to the user. This common software command and control interface allows the user to task receivers at a logical level without the need to worry about how to implement this tasking on a given receiver. This allows a wide range of receivers to be tasked by the NRC in the same manner regardless of the receiver's number, model or configuration and still obtain a standardized digital output.

This receiver hardware abstraction allows the NRC to:

- Easily be programmed to connect to connect to almost any receiver with an audio output.
- Connect with different receivers types simultaneously.
- Control the major functions of any receiver through a simple tasking protocol.
- Provide receiver vendor independence, allowing the user to utilize the most appropriate receiver for a given application.

Receiver XML configuration files are used to define the different receiver protocol profiles. This allows new receiver command and control support to be added to the NRC relatively quickly and simply by generating and integrating a new receiver XML profile file.

System Design

The NRC is extremely reliable and flexible due to the incorporation of:

- Compact Flash (CF) based file system compared to a system hard drive.
  - The NRC file system is contained on a CF card alleviating any hard drive reliability problems from the NRC.
- High Performance, dependable COTS processing cards
  - The NRC internal processing boards are high performance, dependable COTS processing boards with high MTBF. Using COTS boards also aides in keeping the NRC costs down and enhances system support.
- Custom designed Chassis unit.
  - The NRC chassis is designed specifically to robustly and efficiently house and interconnect the NRC internals and provide sufficient air flow through the chassis to dissipate the generated system heat.
- Configurable NRC system XML files
  - The NRC reads a number of different XML system configuration files at boot-up, which allows changes to be integrated into the NRC system without the need for recompilation.
- Remote Software Upgrade Capability
  - The NRC application and software are designed to be remotely upgraded over a network connection. This allows new updates to be uploaded seamlessly into fielded NRC units.

Specifications

System Hardware

- CPU System:
  - PC x86 SBC based system
- Operating System
  - Linux OS, Compact Flash based file system

Physical Inputs/Outputs

- Number of controllable receivers: 1 to 8
- Connections per Receiver
  - 1x Audio Input Port (DB-15)
  - 1x Control Port (RJ-45, RS-232)
- Network Port (RJ-45, 10/100 Base-T Ethernet)
- Remote Serial Terminal Port (DB-9, RS-232)
- External A/D Card Clock Input (BNC, TTL)

A/D Conversion

- Sample Resolution: 16-bit (14.8 effective bits)
- Channel Sampling Rate: 16KHz
- Pre A/D Channel Gain Options: 1 (default), 2, 4, 8
- Internal Sampling Clock
  - Accuracy: 10ppm 0-85C
  - Stability: 10ppm 0-85C
- External A/D Card Clock Input
  - 16KHz TTL square-wave: 50% duty-cycle
  - Optional Input to provide external sync if required
- Analog Signal Input
  - Range: -5V to +5V
  - Types: Single-Ended / Differential

Supported Receivers

- DRS WJ-8723 HF Receiver
- Ten-Tec RX-331HF Receiver
- Additional Receivers available upon request
- Support for non-receiver, analog input signals is also possible.

Support Software

- Java and C++ programming APIs
- Example Client Program
- Remote software upgrade capability

Documentation

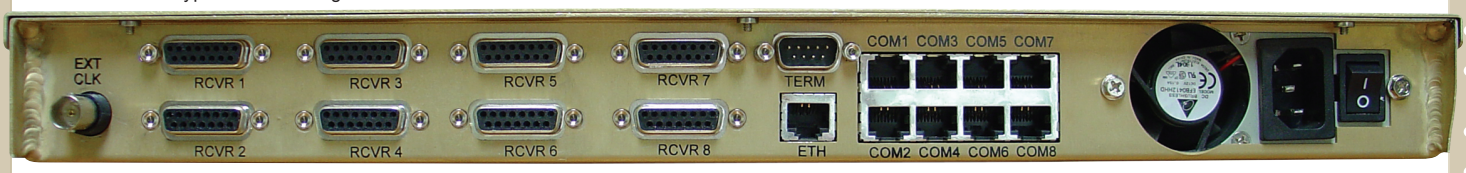
- Programmers Manual
- Users Manual
- Protocol Interfacing Document

Power

- Nominal power: 25 W
- Max power: 32 W
- Operating Range: 100-240VAC, @47-63Hz (Auto-Select)

Chassis

- 1RU (19” x 20” x 1.75”), Fits standard 19-inch racks
- Jonathan 375QD-20 slide mounts fitted
- Weight: 10 lbs
- Ventilation: Positive internal pressure
- Internal Heating Profile:
  - Fully loaded NRC,temperature increase <+15F above ambient



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