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Ground Reference Prototype - Real Time Platform (GRP-RTP) Subsystem Manual

This document has been prepared for:

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1.0 INTRODUCTION

This System Manual provides information about the Ground Reference Prototype - Real Time Platform (GRP-RTP).

The GRP-RTP is part of the Ground Reference Prototype. The GRP provides a functioning ground station for use by NEXCOM avionic vendors to assist with avionic radio testing. The GRP consists of this Real Time Platform, a Software Control Platform (SCP), and two Multimode Digital Radios (MDRs). The purpose of the RTP is to provide real-time voice and messaging functions for the GRP.

The GRP-RTP has been developed for the **NEXCOM Group (ACB-560)** of the Federal Aviation Administration's William J. Hughes Technical Center. The NEXCOM Group supports the following NEXCOM programs:

- Next Generation A/G Communications System (NEXCOM)
- Rapid Prototype Development Effort (RPDE)
- NEXCOM System Demonstrations

1.1 PURPOSE

The purpose of this document is to present a Ground Reference Prototype - Real Time Platform (GRP-RTP) system overview.

1.2 DOCUMENT CONVENTIONS

N/A.

1.3 INTENDED AUDIENCE AND READING SUGGESTIONS

This document is intended for NEXCOM contractors. It provides a GRP system and RTP subsystem overview. The RTP connections and operating details are described in the two primary RTP module assembly manuals: the Octal T1 Module (OTM) Module Manual, and the Voice Channel Module (VCM) Module Manual.

1.4 REFERENCES

Reference documentation includes:

- Octal T1 Module (OTM) Module Manual, CIE Document FA100-00020, v1.0, 01/30/2002.
- Voice Channel Module (VCM) Module Manual, CIE Document FA100-00002, v1.0, 1/30/2002.
- OTM-VCM Interface Control Document, CIE Document FA100-00066, v1.0, 1/30/2002.
- SNS-RTP Interface Control Document, CIE Document FA100-00065, v1.0, 1/30/2002.
- Multimode Digital Radio/Radio Interface Unit Interface Control Document, NAS-IC-41033502, V3.0, 07/23/2001.

1.5 REVISION HISTORY

Date	Revision	Description of Changes
01/30/2003	1.0	Initial Release

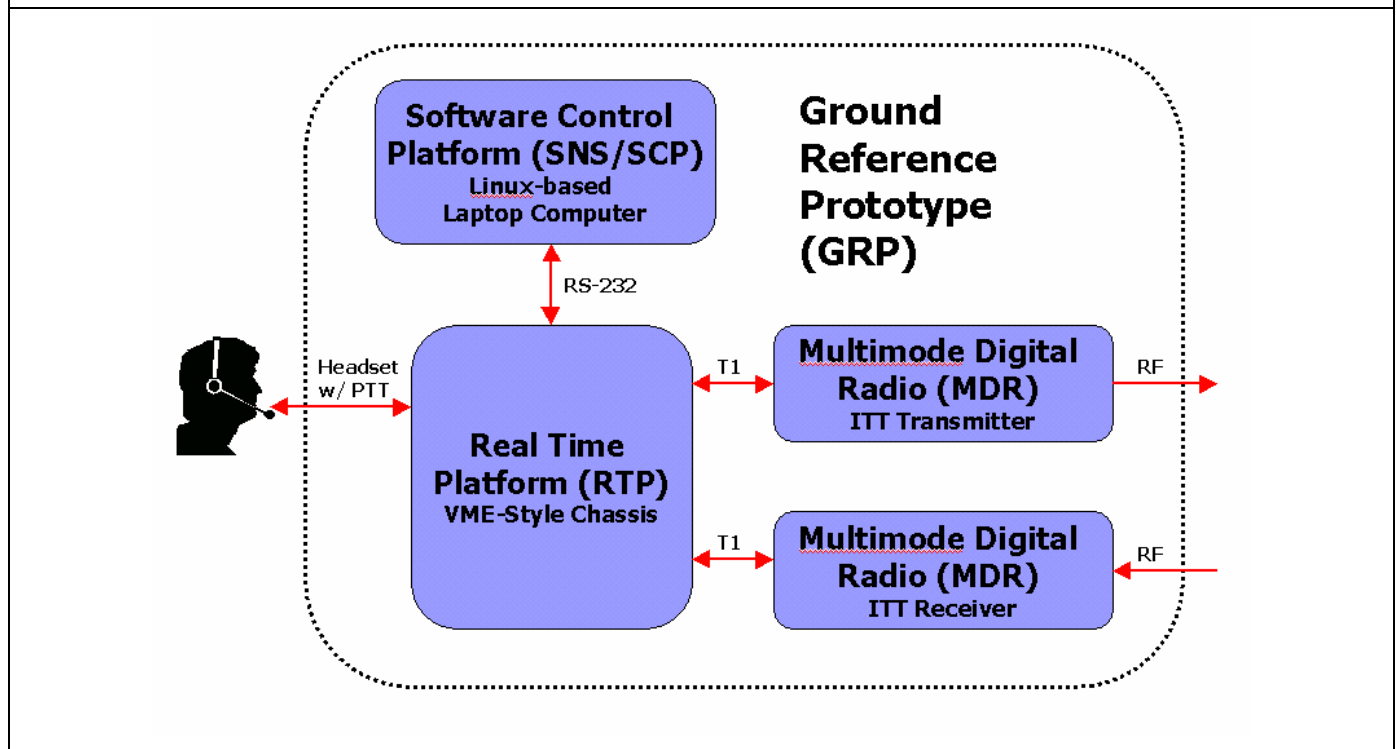


2.0 GENERAL DESCRIPTION

2.1 GRP SYSTEM OVERVIEW

Figure 1 provides a GRP block diagram depicting the RTP subsystem interconnections.

Figure 1. GRP System Block Diagram



The GRP acts as a small NEXCOM ground station. It consists of three subsystem components:

- Software Control Platform (SNS/SCP)
- Real Time Platform (RTP)
- Multimode Digital Radios (MDRs)

The SNS/SCP and RTP subsystems function as a NEXCOM Prototype Radio Interface Unit (PRIU). The SNS/SCP functions as the primary controller for the entire GRP system. It configures all GRP subsystem components and generates/processes all ground station messages. The RTP performs time critical functions such as voice encoding/decoding, NEXCOM timing channel generation, precisely timed message transmission and time stamping of MDR receive messages. The MDRs perform radio frequency (RF) transmission and reception for the GRP ground station.

There are three major user interfaces for the GRP ground system:

- Ground Controller Headset Interface
- SNS/SCP Control Interface
- RF Interface



The RTP is supplied with a compatible headset assembly. The headset includes a microphone, stereo headphones, and a PTT switch. The SNS/SCP Control Interface and RF Interfaces are described in other GRP ground station documentation.

There are two major internal subsystem interfaces:

- SCP-RTP subsystem interface
- RTP-MDR subsystem interface

The SCP-RTP subsystem interface supports MDR data/voice/control messages and RTP voice/control messages. The message protocol is described in the SNS-RTP Interface Control Document. The RTP-MDR subsystem interface is described in the MDR/RIU Interface Control Document.

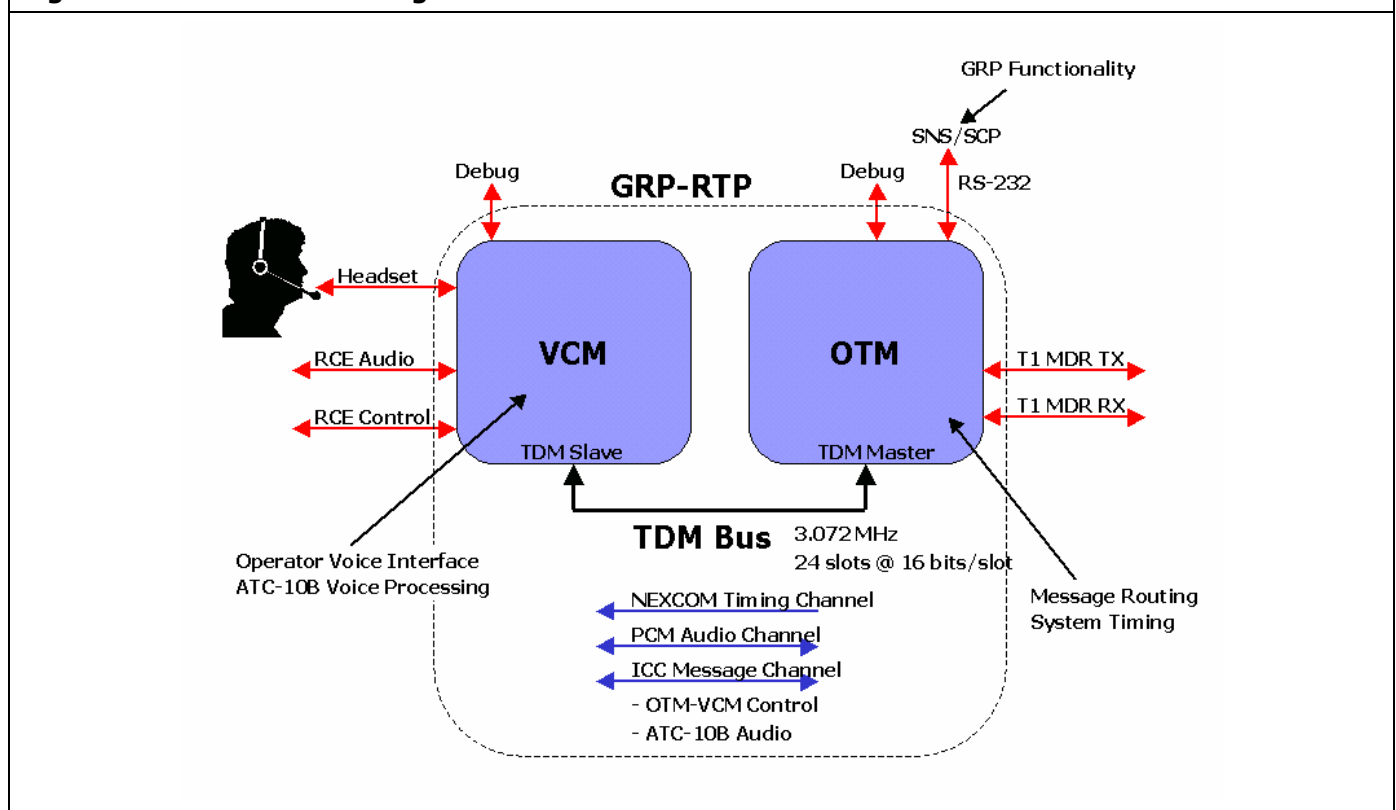
2.2 RTP SUBSYSTEM OVERVIEW

The Ground Reference Prototype - Real Time Platform (GRP-RTP) provides the following features:

- Generates NEXCOM timing channel on MDR T1 ports
- Forwards SNS/SCP messages to MDRs on either a scheduled or immediate basis
- Forwards MDR messages to the SNS/SCP.
- Performs ATC-10B voice encoding and decoding functions
- Provides the headset ground controller interface.
- Field upgradeable software (via Debug Terminal)

Figure 2 depicts the RTP subsystem block diagram.

Figure 2. GRP-RTP Block Diagram



The GRP-RTP contains two primary modules housed in a VME-style chassis.

- Octal T1 Module (OTM): A multi-port T1 interface module that generates NEXCOM system timing and performs message translation/routing functions.
- Voice Channel Module (VCM): A voice processing module that encodes/decodes ground controller voice according to the ATC-10B algorithm.

The OTM and VCM modules communicate over a 24-slot Time Division Multiplexed (TDM) bus.

