Dual GMA1347 in Civil Air Patrol (CAP)
Functional Summary

This document is intended to summarize G1000 Audio Panel (GMA 1347) information that is specific to the Civil Air Patrol (CAP) program and supersedes related information presented in the G1000 Audio Panel Pilot's Guide.

1. References

1. G1000™ Audio Panel Pilot's Guide, Garmin P/N 190-00378-00, Rev B.

2. Requirements

The G1000 installation for the CAP program will include two GMA 1347 audio panels, designated as:

1. GMA #1: Left audio panel
2. GMA #2: Right audio panel

2.1 Receivers/Transceivers

The following receivers or transceivers will be supported in the airplane and will have the following allocation to audio panel functions:

Audio Panel Name	Function
COM1	VHF COM1 radio interface to both audio panels
COM2	VHF COM2 radio interface to both audio panels
COM3	(1)FM or (2) UHF interface to both audio panels (see Note 1)
NAV1	VHF NAV1 receive-only input to both audio panels
NAV2	VHF NAV2 receive-only input to both audio panels
TEL	Full-Duplex Telephone interface to both audio panels
AUX	DF receive-only input to both audio panels

Notes to Table:

1. Two externally provided switches, called the PILOT COM3 SWITCH and COPILOT COM3 SWITCH, will determine whether the FM or UHF transceiver is connected to COM3 on the respective GMA.

For the purposes of this summary, the following are definitions for seat locations in the airplane:

- Seat 1: front left seat
- Seat 2: front right seat
- Seat 3: rear left seat
- Seat 4: rear right seat

Seat 1 is always connected to the PILOT input on GMA #1.

Seat 4 is always connected to a PASSENGER input on GMA #2.

To allow Seat 3 to transmit, an externally provided two-state switch will allow a swap in the functional relationship of Seat 2 and Seat 3 relative to GMA #2. This switch is called the SEAT 2/3 SWITCH. The states of this switch are:

States of SEAT 2/3 SWITCH	**How connected to GMA #2**
SEAT 2 ON CO-PILOT; SEAT 3 ON PASSENGER	Seat 2 is connected to the CO-PILOT inputs on GMA #2. Seat 3 is connected to a PASSENGER input on GMA #2.
SEAT 3 ON CO-PILOT; SEAT 2 ON PASSENGER	Seat 3 is connected to the CO-PILOT inputs on GMA #2. Seat 2 is connected to a PASSENGER input on GMA #2.

The PILOT shall have transmit priority on COM1. The CO-PILOT (whether that is Seat 2 or Seat 3) shall have transmit priority on COM2.

Since the TEL interface is full duplex, there is no transmit priority. Whoever is connected to the phone will transmit whenever they speak and multiple inputs will simply be transmitted simultaneously.

To allow transmission from the Rear Left Seat passenger, external relays and switches will be used to connect either the Passenger or the Co-Pilot to the Co-pilot input. When the passenger is connected to the Co-Pilot input, the Co-Pilot shall be connected to the Passenger input to keep Intercom capability and receive selected radio transmissions.

The Pilot (Front Left Seat) shall be capable of transmitting on all Transceivers and will have priority on all transceivers except COM2 **and COM3**.

The Co-Pilot (Front Right Seat) or Rear Left seat passenger shall be capable of transmitting on all Transceivers and will be slave to the Pilot on all channels save COM2 **and COM3**.

The Copilot (Front Right Seat) and Passenger (Rear Left Seat) shall not be able to transmit simultaneously as they are connected in an either-or manner.

No COM 3 prioritization shall exist.

2.2 Aircraft Radios

PA, DME, ADF, PLAY, & COM 1/2 are not required for this installation. By disabling PA, DME, ADF, PLAY, and COM 1/2 on the GMA Configuration Page of the PFD, pressing the PA, DME, ADF, PLAY or COM 1/2 key does not illuminate the corresponding annunciator light.

The DF receiver shall be connected to the AUX input.

2.3 Failsafe Operation

If the GMA1347 loses power for any reason, the Pilot's channel will be connected to the on-side COM for that channel. The Pilot's unit shall have COM1 as its on-side channel and the Co-Pilot's unit shall have COM2 as it's on-side channel. In addition, each audio panel has a FAILSAFE WARN input that provides an additional receive only channel during failsafe mode. The Pilot's unit may have COM2 connected to this input while the Co-Pilot's unit may have COM1 connected to its FAILSAFE WARN input.

2.4 Intercom System

Please see G1000™ Audio Panel Pilot's Guide (Garmin P/N 190-00378-00, currently at Rev B) for intercom operations.

The intercom system shall provide four modes of isolation: Pilot, Copilot, Crew, & All. In Pilot mode, the Pilot is isolated from all other occupants of the aircraft. In Copilot isolation mode, the Copilot is in his own intercom loop while the Pilot and Passengers share the other intercom loop. In Crew Isolation mode, the Pilot and Copilot can communicate with each other and the passengers are isolated from the crew but able to communicate with each other. In All mode, there is no isolation and every occupant can communicate with every other occupant.

The Pilot and Copilot (or Rear Left Seat passenger when enabled) positions shall be able to independently choose which receivers to monitor. COM1, COM2, NAV1, NAV2, FM, SATPHONE, UHF, Marker Beacon, and DF (connected to AUX). The primary (mic selected) COM shall automatically be selected along with the corresponding transmitter.

3. Risks

3.1 Simultaneous transmission over separate radios.

The dual installation provides a means for the pilot and copilot to transmit simultaneously over separate radios. Depending on the frequencies chosen for these transmissions and the physical location of the COM antennae, there is a possibility for 'bleedthrough' from one channel to the other. In a smaller airframe it is difficult to achieve sufficient isolation between the two COM antennae to prevent this problem. If the COM radios utilize a "transmit interlock" system, simultaneous transmissions may require that this feature is enabled. Garmin makes no expressed or implied guarantees regarding the suitability of simultaneous transmission in a given installation.

Garmin understands CAP is willing to accept existing antenna placement if alternative antenna placement cannot be reasonably achieved and CAP understands simultaneous transmissions over COM1 & COM2 may not be possible.