



ComAir5 TX using GPCD3/6/9 User's Manual V1.0

06/17/2013

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1 Revision History

1.1 Document History

Revision	Date	By	Remark
V1.0	06/17/2013	Porter Yang	Original Version

2 ComAir5 Summary

The ComAir5 algorithm provides the ability to transmit-receive commands through the air. This algorithm can be used in communication areas. Below are some recommended considerations developers should consider.

2.1 Transmission Distance

The maximum transmission distance between transmitter and receiver depends on the room acoustics, echoes, and environment noise. Also the transmission power or sound amplitude plays an important role. Generally speaking, if the separation distance is up to 5meters, the transmission power should be larger than 50dB.

2.2 Speaker and Microphone Selection

The separation distances talked above assume selection of proper high-quality microphones and speakers. Many brands of electret microphones have flat frequency responses to 20 kHz, which is more than adequate. However, not all microphones meet this specification. Avoid microphones that do not have flat frequency responses to 20 kHz.

Selection of speakers is more difficult because many, but not all, inexpensive speakers are satisfactory and meet specifications. Thus, the best approach is to try several speakers and select one that produces audio signals that are sufficiently loud and that works as a sonic tone component to the distances required by the application.

2.3 Environment Consideration

If there is any sound absorbing material in front of the microphone or speaker, the performance can degrade a lot. The material covering microphones and speakers must be the minimum possible.

2.4 Filter in the Electrical Circuit

The electrical filters connected to microphone or speaker should have upper cut off frequency not less than working frequency. The proper frequency response can be achieved by proper selection of resistors and capacitors.

2.5 The Data Format

1 tone	3 tone	1 tone
SYNC	DATA	CHECKSUM

SYNC: Synchronization signal.

DATA: Total of 80 command

CHECKSUM: check the accuracy of data transmitted.

To send a command takes 1.1 second.

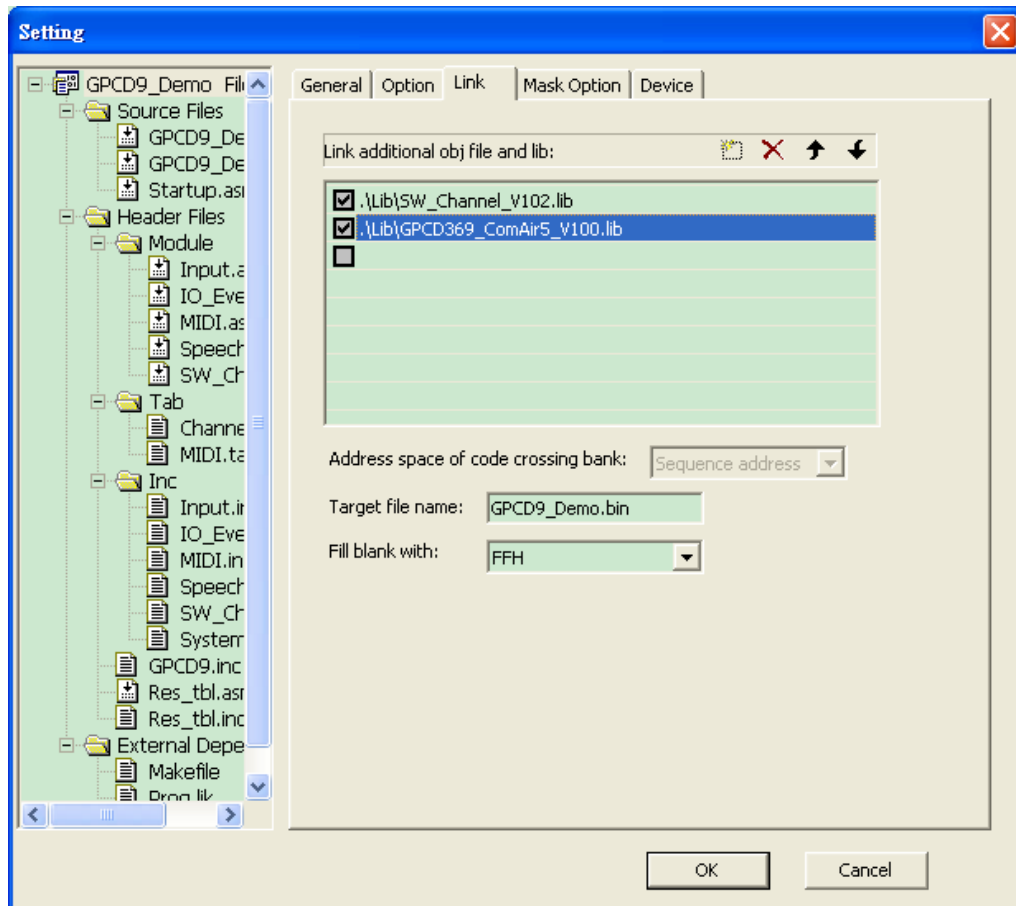
3 ComAir5 TX Library for GPCD3/6/9

3.1 Library

- ◆ GPCD369_ComAir5_Vxxx.lib

3.2 Project Setup

Please include the code library “GPCD369_ComAir5_Vxxx.lib” in the Setting -> Link



3.3 Demo Code

A demo code is offered for this library. In this demo code, not only has the library been included, but also all settings have been completed. Users only need to open it with FortisIDE or G+ IDE and modify the program to meet user's application. It is one of the most effective ways to use this library. Please refer to following section for more information about the parameter settings of ComAir5 TX library.

3.4 Hardware Resource

The Time B & Timer C are used for ComAir5 TX library in GPCD3/6/9 series. The Timer B is used

to generate a square wave for ComAir5 command in NMI interrupt, and the Timer C is used to service ComAir5 library. That is, the Timer B, Timer C and related functions are not available while sending a ComAir5 command, such as SW_ChB, IR, PWMIO, Capture and Comparison, etc.

3.5 Main Frequency

Users can modify the declaration of main frequency according to different applications in ComAir.inc. The default value in demo code is 17000Hz. The declaration is as below:

```
D_MainFreq:    .EQU    17000    ;Main frequency for ComAir5
```

4 API of ComAir5 for GPCD3/6/9

4.1 Initializes ComAir5

Syntax: F_CA5_Initial

Purpose: Call this function to do necessary initial for ComAir5 library, including variables and registers.
User should run the subroutine once after reset

Parameters: None

Return Value: None

Library: GPCD369_ComAir5_Vxxx.lib

Destroy: A, X, Y

4.2 ComAir Control

4.2.1 Send Command

Syntax: F_CA5_SendCommand

Purpose: Send a ComAir5 command

Parameters: X = Command (0 ~ 79)

Return Value: None

Library: GPCD369_ComAir5_Vxxx.lib

Destroy: A, Y

Example: Send the ComAir5 command 08H

```
LDX    #08H
JSR    F_CA5_SendCommand
```

4.2.2 Stop Sending Command

Syntax: F_CA5_Stop

Purpose: Stop sending a ComAir5 command

Parameters: None

Return Value: None

Library: GPCD369_ComAir5_Vxxx.lib

Destroy: A

4.2.3 Check Status of ComAir5

Syntax: F_CA5_IsActive

Purpose: Check if the ComAir5 is active

Parameters: None

Return Value: C = 0, inactive; C = 1, active

Library: GPCD369_ComAir5_Vxxx.lib

Destroy: A

4.3 Interrupt Service Routine for ComAir

Syntax: F_CA5_Service

Purpose: Service for ComAir5 library. It should be executed in Timer C's interrupt service routine

Parameters: None

Return Value: None

Library: GPCD369_ComAir5_Vxxx.lib

Destroy: A, X, Y

5 Resources List of ComAir5 for GPCD3/6/9

5.1 Resource Used for ComAir5 Library

- ◆ RAM used: 13
- ◆ ROM used: Approx. 4.8K bytes
- ◆ Timer used: Timer B & Timer C

6 Application Circuit for GPCD3/6/9

