

# ARINC 429 / ARINC 717 - PC USB Interface

by Steven J. Merrifield, Jan 2017

This board provides an interface between a PC USB port and an ARINC 429 or ARINC 717 avionics bus. It can send and receive both 429 and 717. All received data is time-stamped with a 1ms resolution, and data can be logged to a file for later analysis.

The PC serial port must be configured for 921600 baud, N81. The high baud rate is required in order to support capturing and displaying the high speed ARINC 429 bus in real time.

The physical interfaces for both 429 and 717 can be switched from bipolar +/- 5V levels to unipolar 3.3V levels for direct connection to digital logic without requiring level conversion.

Status LEDs:

LED	On	Off
D4	Waiting for label data from user	Received full command
D5	ARINC 429 parity disabled	ARINC 429 parity enabled
D6	ARINC 717 mode selected	ARINC 429 mode selected
D7	ARINC 429 low speed	ARINC 429 high speed

ARINC 429 Commands:

M	Mode select – toggles between ARINC 429 and ARINC 717 – see D6
S	Sets ARINC 429 transmit speed – toggles between 100k and 12.5k – see D7
P	Toggles ARINC 429 parity bit – see D5
Lxxx	Sets ARINC 429 label to receive in octal, eg L123 (note 3 digits, L000 = all labels)

ARINC 717 Commands:

M	Mode select – toggles between ARINC 429 and ARINC 717 – see D6
R	Resets synchronization – required after changing the word rate
Lxxxx	Sets ARINC 717 label to receive in decimal, eg L0001 (note 4 digits) – see D4
W0	Sets ARINC 717 word rate to 32 wps
W1	Sets ARINC 717 word rate to 64 wps
W2	Sets ARINC 717 word rate to 128 wps
W3	Sets ARINC 717 word rate to 256 wps
W4	Sets ARINC 717 word rate to 512 wps
W5	Sets ARINC 717 word rate to 1024 wps
W6	Sets ARINC 717 word rate to 2048 wps
W7	Sets ARINC 717 word rate to 4096 wps

Receiving ARINC 717	Receiving ARINC 429
Press 'M' to select ARINC 717 mode. Press 'Wx' to set the word rate. Press 'R' to resynchronize. Press 'L0001' to verify sync words. Press 'Lxxx' to monitor chosen word.	Press 'M' to select ARINC 429 mode. Press 'L000' to verify all labels are received. Press 'Lxxx' to monitor chosen label. Press 'P' to toggle parity bit as desired. (Speed will be detected automatically)

Sending ARINC 717	Sending ARINC 429
Press 'M' to select ARINC 717 mode. Press 'Wx' to set the word rate.  The generator uses a fixed pattern of data. Word 1 is the sync word, and cycles through 247, 5B8, A47, DB8. Words 2-3 are a frame counter, and increment each frame. Word 2 is the MSB, word 3 is the LSB. Words 4 through to the selected word rate contain data corresponding to the word number-1. Only the bottom eight bits are used, the top 4 bits are set to "0000".	Press 'M' to select ARINC 429 mode. Press 'S' to select high or low speed.  The generator uses a fixed pattern of labels and data. The data uses the lower 8-bits and increments in fixed steps dependent on the ARINC 717 word rate and 429 speed.  Label 100 is sent 16 times per second. Label 123 is sent 8 times per second. Label 250 is sent 4 times per second.

ARINC 429 DIP switches:

	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
Sending @ 3.3V levels	X	X	X	X	Closed	Closed	Open	Open
Sending @ +/- 5V levels	X	X	X	X	Open	Open	Closed	Closed
Receiving @ 3.3V levels	Closed	Closed	Open	Open	X	X	X	X
Receiving @ +/- 5V levels	Open	Open	Closed	Closed	X	X	X	X

ARINC 717 DIP switches:

	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
Sending @ 3.3V levels	X	X	X	X	Open	Closed	Open	Closed
Sending @ +/- 5V levels	X	X	X	X	Open	Open	Open	Open
Receiving @ 3.3V levels	X	X	X	X	Closed	Open	X	Closed
Receiving @ +/- 5V levels	X	X	X	X	Open	Open	Closed	Closed
Loopback @ 3.3V levels	X	X	X	X	Closed	Closed	Open	Closed

Typical examples of captured data:

Receiving ARINC 717, L0001	Receiving ARINC 429, label 100, parity enabled	Receiving ARINC 429, all labels, parity enabled
5.464 247	7.622 100 000048	3.499 100 000006
6.464 5B8	7.685 100 000048	3.562 100 000006
7.464 A47	7.747 100 800049	3.562 123 800006
8.464 DB8	7.810 100 800049	3.624 100 000006
9.464 247	7.872 100 800049	3.687 250 800007
0.464 5B8	7.935 100 80004A	3.687 100 800007
1.464 A47	7.997 100 80004A	3.687 123 000007
2.464 DB8	8.060 100 80004A	3.749 100 800007
3.464 247	8.122 100 00004B	3.812 100 800007
4.464 5B8	8.185 100 00004B	3.812 123 000007
5.464 A47	8.247 100 00004B	3.874 100 800008
6.464 DB8	8.310 100 00004B	3.937 250 800008
7.464 247	8.372 100 80004C	3.937 100 800008
8.464 5B8	8.435 100 80004C	3.937 123 000008
9.464 A47	8.497 100 80004C	3.999 100 800008
0.464 DB8	8.560 100 00004D	4.062 100 000009
1.464 247	8.622 100 00004D	4.062 123 800009
2.464 5B8	8.685 100 00004D	4.124 100 000009
3.464 A47	8.747 100 00004E	4.187 250 000009
4.464 DB8	8.810 100 00004E	4.187 100 000009
5.464 247	8.872 100 00004E	4.187 123 800009
6.464 5B8	8.935 100 80004F	4.249 100 00000A
7.464 A47	8.997 100 80004F	4.312 100 00000A
8.464 DB8	9.060 100 80004F	4.312 123 80000A
9.464 247	9.122 100 000050	4.374 100 00000A
0.464 5B8	9.185 100 000050	4.437 250 80000B
1.464 A47	9.247 100 000050	4.437 100 80000B
2.464 DB8	9.310 100 800051	4.437 123 00000B
3.464 247	9.372 100 800051	4.499 100 80000B
4.464 5B8	9.435 100 800051	4.562 100 80000B
5.464 A47	9.497 100 800052	4.562 123 00000B
6.464 DB8	9.560 100 800052	4.624 100 80000B