

"can_song_network_example"

CAN Software Example of Fragmented Message

AT90CAN32/64/128



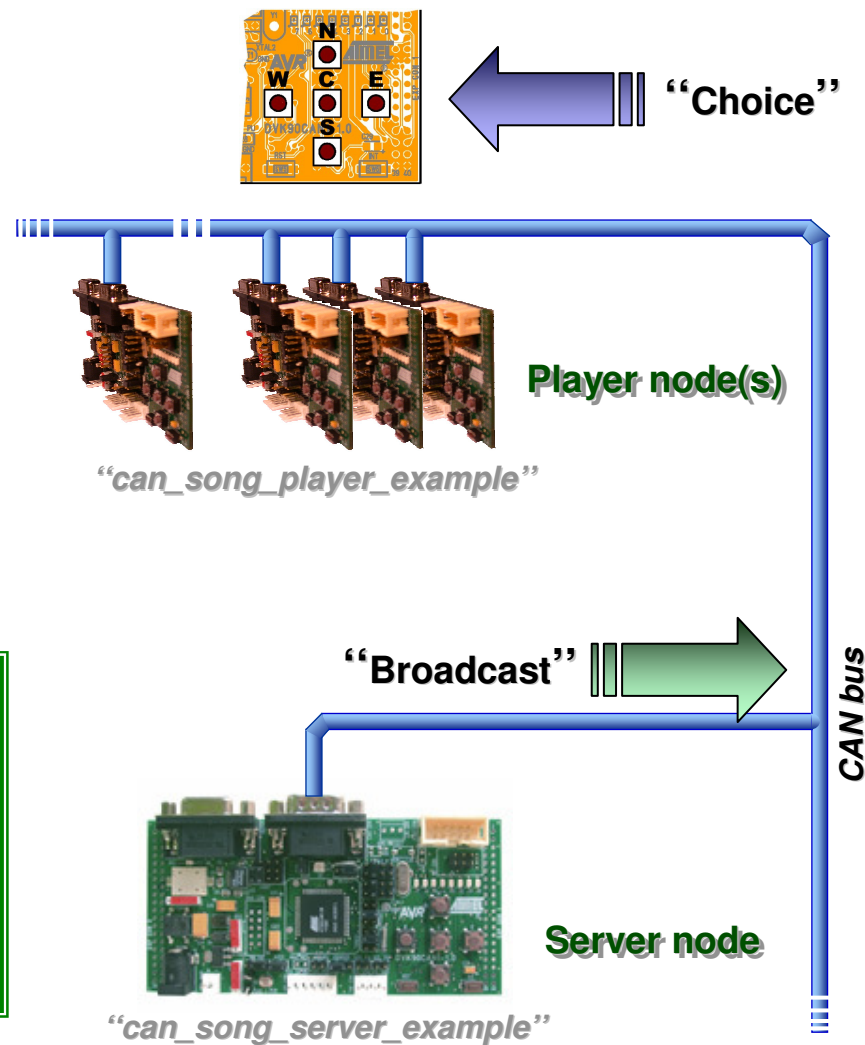
Demo. program

Player:

- The program waits for keyboard activity.
- Once a key is pushed, the routine waits for the beginning of the burst of the selected song (one song by key configuration).
- Then, the broadcasted song is:
 - read and de-fragmented,
 - recorded and
 - played once.
- And so on...

Server:

- The server uses a fragmentation template to encode the data of the songs to broadcast.
- Up to 6 encoded song messages are broadcasted on the CAN bus.
- A song is a burst of CAN messages with the same ID (CAN2.0A).
- One burst for one song.
- The songs are re-coded RTTTL ringtones.



Demo. environment

■ IDE:

AVR Studio 4.13.528 (or higher), AVRGCC plug-in & CAN plug-in

■ C Compiler:

WinAVR-20070122

■ Default targets:

DVK90CAN1 Atmel development boards

■ Configuration:

■ Software:

Described in «**config.h**» in main root of the following projects:

- «**can_song_player_example**» project,
- «**can_song_server_node_example**» project,

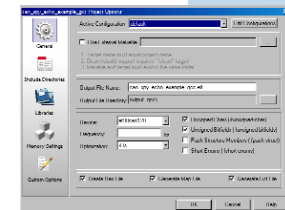
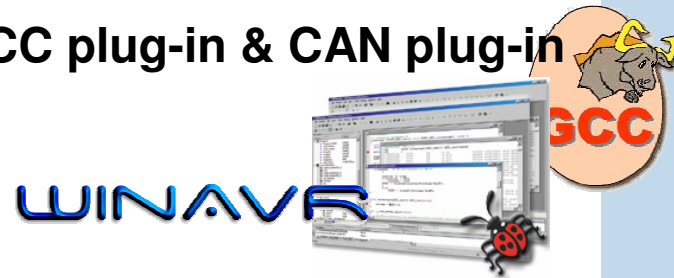


■ Hardware:

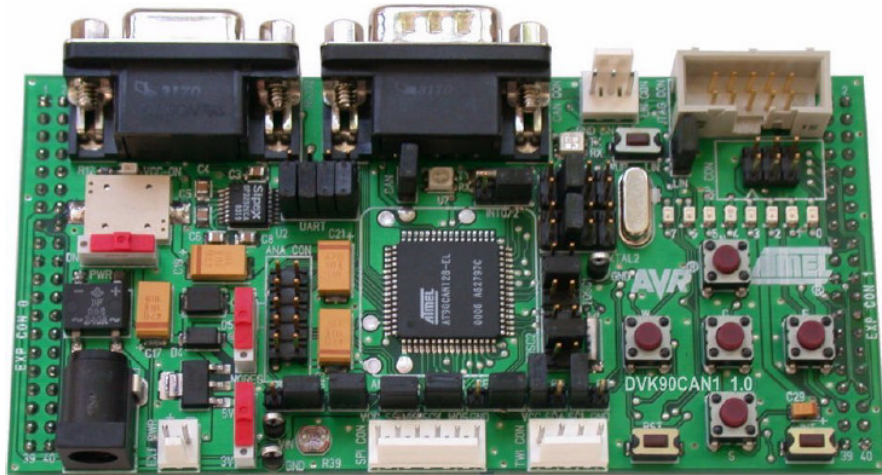
Described in «**..\libraries\lib_board\dvk90can_board.h**» (called by «**config.h**»)

■ Default setting:

- Microcontroller: **AT90CAN128** at 8 MHz (external crystal - no internal RC)
- CAN bitrate: **250** Kbps (fixed)

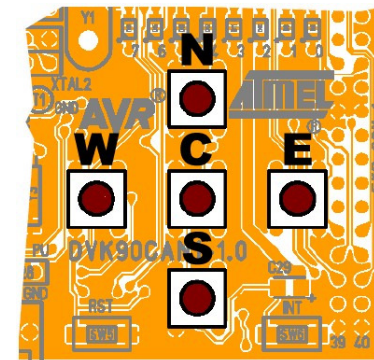


Using the “Song_Player”

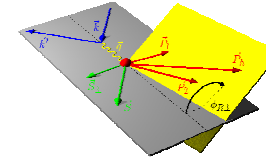


- ☐ Up to 6 songs
- ☐ Use keys to choice a song

N(orth) key: Beverly Hills Cop
S(outh) key: The Exorcist
W(est) key: Pulp Fiction
E(ast) key: The good, the bad & the ugly
C(enter) key: Indiana Jones
W + E keys: Coca Cola – Chihuahua



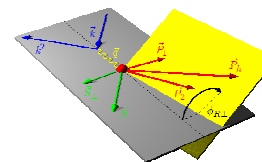
Fragmentation (1)



□ Principal

- ✓ The purpose of this example is to handle fragmented messages carried away by a CAN medium. Because a message can be longer than a unitary CAN data message (8 bytes), a coding method is needed to be able to re-order some unitary CAN data messages into the original whole message.
- ✓ The principle of this coding is to introduce fragmentation information in the data CAN message itself. In this example, this information is the index of the first byte into the original message. Two makers are also needed, one to indicate the start of the message and an other one to indicate the end of this message. With a 16-bit index, messages up to (65536+6) bytes can be carried away.
 - The index "0" is chosen as the marker of start of message.
 - Because we don't know the length of the message, the end of message marker will be chosen following the type of the message (i.e. the end of a "printf()" string is 0x00 because it isn't an ASCII character).

Fragmentation (2)



□ Coding rules (of this example)

- ✓ This example uses re-coded **RTTTL** ringtones. The template of a song string is given in "**audio_drv.c**" file.

- ✓ If the string is:

unsigned short ack_jingle[] = { 100, 110, E5, 150, E5, 150, E5, 800, C5, 0 } ;

- (100, 110 ... are decimal unsigned 16-bit integer),
- (E5, C5, ... are for #define tone codes listed in "**audio_drv.h**" file),
- (100 = 0x0064, 110 = 0x006E, E5 = 0x02F6, 150 = 0x0096, C5 = 0x03BB, ...).

- The first CAN message is:

- ID=123, DLC=8, DATA = 00, 00, 64, 00, 6E, 00, F6, 02
(where 00,00 is the 16-bit index of the first element: 64).

- The second CAN message is:

- ID=123, DLC=8, DATA = 00, 06, 96, 00, F6, 02, 96, 00
(where 00,06 is the 16-bit index of the element: 96).

- The third CAN message is:

- ID=123, DLC=8, DATA = 00, 0C, F6, 02, 20, 03, BB, 03
(where 00,0C is the 16-bit index of the element: F6).

- The fourth CAN message is:

- ID=123, DLC=4, DATA = 00, 12, 00, 00
(where 00,12 is the 16-bit index of the element: 00),
(where 00,00 at the end means: «End Of Message», so DLC = 4).

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