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## Close Combat 2 "A Bridge Too Far"

# Patching the Soldiers' Colours

## (Pc- & Mac-version of CC2)

### What it is

"Close Combat - A Bridge Too Far" (abbreviated CC2, ABTF, CC2-ABTF) was the second game of the CloseCombat-series created by Atomic and presented by Microsoft to the Mac-community. It was also the last game of this series for the MacOS. The series was then continued by SSI for PCs only (up to day CC3, CC4, CC5). The game was released in 1997 on a hybrid-CD, running on PCs and under the MacOS 7.5 up to 9.1 as well.

### Many thanks to CPL FILTH

Many thanks to CPL FILTH ([psaasta@otitsun.oulu.fi](mailto:psaasta@otitsun.oulu.fi)) for his great work. Without his program "SolColor.Exe" the change of the soldiers' colours for the PC-version of CC2 would be not so easy and the following work for the Mac-version of CC2 could never be done by myself. Please look at his homepage for further development on more fine CC2-CC3-CC4-CC5-tools: <http://www.student.oulu.fi/%7Epsaastam/>

### What do you need

First of all you need the original CD "Close Combat : A Bridge Too Far" (hybrid PC / Mac) and the last available update from the internet (version 2.0b: [www.microsoft.com/games/closecombat/cc2/downloads.htm](http://www.microsoft.com/games/closecombat/cc2/downloads.htm)). For patching the source code of the PC-program "CC2.Exe" you can download CPL FILTH's "SolColor.exe" from his site (see above). For patching the source code of the Mac-program "A Bridge Too Far" you can use any MacOS Hex-Editor.

### Patching the soldiers' colours on a PC

Some Close Combat 2-mods requires changing the soldiers' uniform colours. In early 2001 CPLFILTH ([psaasta@otitsun.oulu.fi](mailto:psaasta@otitsun.oulu.fi)) made a PC-program called "SldColor.Exe", which can be downloaded from his site (<http://www.student.oulu.fi/~psaastam/>). With this program it is easy to patch the colour-table located in the source code of "CC2.Exe" containing the values for the soldiers' colours. The task is now to make access to this table in the source code of the Mac-version of Close Combat 2.

First have a look at the usual colour definitions: German troops are wearing grey (Feldgrau) or grey/green uniforms, Allied troops are wearing brown, green/brown (British) or lightgreen (US Army) uniforms. In the PC- and the Mac-version of "Close Combat 2 – A Bridge Too Far" the colours are defined separately for body, legs, head, belt, boots and weapon. In the colour-table in the source code are these 6 "slots" and three more definition "slots" of unknown purpose (filled with zero

bytes) placed for 29 different soldier colour definitions. The program "SldColor.Exe" of CPLFILTH counts the soldiers from 0 to 28. As CPLFILTH writes in his short RedMe-file to "SldColor.Exe", each "slot" contains the value of the colour in a shortend RGB-format (3 bytes per slot as 5-bit short-integer, value range from -31 to 31 for each byte). In the PC-version the byte order is "Blue – Green – Red", in the Mac-version the byte order is "Red – Green – Blue". Higher values mean lighter and more color, values around 0 mean less color, 0 mean no colour (result is grey or black, depending on the uncoloured sprite) and negative values mean dark colour. The RGB-value of each slot is taken as a modifier applied to 16-bit of the uncoloured sprites in the files "/Graphics/Soldier" and "Graphics/SoldierB" (this files can be examined with the tool "SprPack.Exe" by KONRAD) during runtime. That means, that the differences of the soldier sprites are only in their colour and their weapon. The program uses the same uncoloured sprites for German and Allied soldiers as well.

The organization of the colour-table differs between PC- and Mac-version (of course?). In the source code of "CC2.Exe" the colour table is of fixed size: each of the 29 definitions occupies 36 bytes. The address of the table is 14805Chex. Each "slot" is four bytes long: bytes for Red, Green, Blue and a separating zero byte. Analyzing the table using CPLFILTH's tool will give the following result:

Close Combat 2 - A Bridge Too Far

File: CC2.Exe (updated to v2.0b)

PC-version 2.0b analyzed using SldColor.Exe (a tool made by CplFiltH)

Color	CplFiltH's	Screen-Display: Blue; Green; Red; ....						Group
legs/body	Uniform No.	Body	Legs	Head	Belt	Boots	Weapon	
grey/grey	0	-4; -3; -5;	-5; -4; -6;	3; 3; 1;	0; 0; 0;	0; 0; 0;	-8; -8; -8	German army
grey/grey	1	-4; -3; -5;	-5; -4; -6;	3; 3; 1;	0; 0; 0;	0; 0; 0;	-7; -5; 1;	German army
grey/grey	2	-4; -3; -5;	-5; -4; -6;	3; 3; 1;	0; 0; 0;	0; 0; 0;	-7; 1; 6;	German army
grey&green	3	-15; -8; -10;	-5; -4; -6;	-4; 2; -6;	0; 0; 0;	0; 0; 0;	-7; -5; 1;	SS
grey&green	4	-15; -8; -10;	-5; -4; -6;	-1; 3; -3;	0; 0; 0;	0; 0; 0;	-8; -8; -8	SS
grey&green	5	-15; -8; -10;	-5; -4; -6;	-1; 3; -3;	0; 0; 0;	0; 0; 0;	-7; 1; 6;	SS
brown	6	-17; -1; 0;	-31; -3; -1;	-23; 5; 8;	0; 0; 8;	-12; -10; 10;	-8; -8; -8;	British army
darkgreen&green	7	-15; -8; -10;	-13; -9; -14;	-1; 3; -3;	0; 0; 0;	0; 0; 0;	-7; -5; 1;	FJ - German AB
darkgreen&green	8	-15; -8; -10;	-13; -9; -14;	-1; 3; -3;	0; 0; 0;	0; 0; 0;	-8; -8; -8;	FJ - German AB
darkgreen&green	9	-15; -8; -10;	-13; -9; -14;	-1; 3; -3;	0; 0; 0;	0; 0; 0;	-7; 1; 6;	FJ - German AB
darkgrey	10	-10; -10; -10;	-10; -10; -10;	1; 1; 1;	0; 0; 0;	0; 0; 0;	-1; -1; -1;	German ???
brown with green head	11	-14; -2; 2;	-15; -9; -4;	-7; 1; -3;	-6; 1; 8;	-5; 7; 7;	-11; -3; 5;	US airborne
brown with green head	12	-14; -2; 2;	-15; -9; -4;	-7; 1; -3;	-6; 1; 8;	-5; 7; 7;	0; 2; 2;	US airborne
brown with green head	13	-14; -2; 2;	-15; -9; -4;	-7; 1; -3;	-6; 1; 8;	-5; 7; 7;	-31; 2; 2;	US airborne
brown with green head	14	-14; -2; 2;	-15; -9; -4;	-7; 1; -3;	-6; 1; 8;	-5; 7; 7;	-31; 2; 2;	US airborne
lightgreen	15	-28; -1; -2;	-31; -4; -5;	-11; 3; 0;	0; 0; 0;	0; 0; 0;	-10; 1; 7;	US army
lightgreen	16	-28; -1; -2;	-31; -4; -5;	-11; 3; 0;	0; 0; 0;	0; 0; 0;	0; 0; 0;	US army
lightgreen	17	-28; -1; -2;	-31; -4; -5;	-11; 3; 0;	0; 0; 0;	0; 0; 0;	-28; 3; 2;	US army
brown&green	18	-31; -7; -11;	-31; -3; 0;	-31; 1; -2;	-7; -5; 1;	-12; -10; 10;	-31; 2; 2;	British or Polish AB
brown	19	-17; -1; 0;	-31; -3; -1;	-23; 5; 8;	0; 0; 8;	-12; -10; 10;	-8; 1; 7;	British army
brown	20	-17; -1; 0;	-31; -3; -1;	-23; 5; 8;	0; 0; 8;	-12; -10; 10;	-7; -5; -5;	British army
brown	21	-17; -1; 0;	-31; -3; -1;	-23; 5; 8;	0; 0; 8;	-12; -10; 10;	-28; 3; 2;	British army
brown	22	-17; -1; 0;	-31; -3; -1;	-23; 5; 8;	0; 0; 8;	-12; -10; 10;	-7; 1; 6;	British army
brown&green	23	-31; -7; -11;	-31; -3; 0;	-31; 1; -2;	-7; -5; 1;	-12; -10; 10;	-13; -2; 5;	British or Polish AB
brown&green	24	-31; -7; -11;	-31; -3; 0;	-31; 1; -2;	-7; -5; 1;	-12; -10; 10;	-7; -5; -5;	British or Polish AB
brown&green	25	-31; -7; -11;	-31; -3; 0;	-31; 1; -2;	-7; -5; 1;	-12; -10; 10;	-28; 3; 2;	British or Polish AB
lightgreen with red head	26	-28; -1; -2;	-31; -4; -5;	-5; -8; 4;	0; 0; 0;	0; 0; 0;	0; 0; 0;	US ???
brown&green	27	-31; -7; -11;	-31; -3; 0;	-31; 1; -2;	-7; -5; 1;	-12; -10; 10;	-7; 1; 6;	British or Polish AB
brown with dark head	28	-17; -1; 0;	-12; -9; -6;	1; 1; 1;	0; 0; 8;	-12; -10; 10;	-7; -5; -5;	British ???

Analyzing the table using a Hex-Editor will give the following result:

Close Combat 2 - A Bridge Too Far  
File: CC2.Exe (updated to v2.0b)  
PC-version 2.0b analyzed using a HexEditor

Color	CplFilt's	Slot-Format: Blue; Green; Red; 00h;						starting at
legs/body	Unif. No.	Body	Legs	Head	Belt	Boots	Weapon	Hex-Addr.
grey/grey	0	FCh; FDh; FBh;	FBh; FCh; FAh;	03h; 03h; 01h;	0; 0; 0;	0; 0; 0;	F8h; F8h; F8h;	14805Ch
grey/grey	1	FCh; FDh; FBh;	FBh; FCh; FAh;	03h; 03h; 01h;	0; 0; 0;	0; 0; 0;	F9h; FBh; 01h;	148080h
grey/grey	2	FCh; FDh; FBh;	FBh; FCh; FAh;	03h; 03h; 01h;	0; 0; 0;	0; 0; 0;	F9h; 01h; 06h;	1480A4h
grey&green	3	F1h; F8h; F6h;	FBh; FCh; FAh;	FCh; 02h; FAh;	0; 0; 0;	0; 0; 0;	F9h; FBh; 01h;	1480C8h
grey&green	4	F1h; F8h; F6h;	FBh; FCh; FAh;	FFh; 03h; FDh;	0; 0; 0;	0; 0; 0;	F8h; F8h; F8h;	1480ECh
grey&green	5	F1h; F8h; F6h;	FBh; FCh; FAh;	FFh; 03h; FDh;	0; 0; 0;	0; 0; 0;	F9h; 01h; 06h;	148110h
brown	6	EFh; FFh; 00h;	E1h; FDh; FFh;	E9h; 05h; 08h;	00h; 00h; 08h;	F4h; F6h; 0Ah;	F8h; F8h; F8h;	148134h
darkgreen&green	7	F1h; F8h; F6h;	F3h; F7h; F2h;	FFh; 03h; FDh;	0; 0; 0;	0; 0; 0;	F9h; FBh; 01h;	148158h
darkgreen&green	8	F1h; F8h; F6h;	F3h; F7h; F2h;	FFh; 03h; FDh;	0; 0; 0;	0; 0; 0;	F8h; F8h; F8h;	14817Ch
darkgreen&green	9	F1h; F8h; F6h;	F3h; F7h; F2h;	FFh; 03h; FDh;	0; 0; 0;	0; 0; 0;	F9h; 01h; 06h;	1481A0h
darkgrey	10	F6h; F6h; F6h;	F6h; F6h; F6h;	01h; 01h; 01h;	0; 0; 0;	0; 0; 0;	FFh; FFh; FFh;	1481C4h
brown w/ green h.	11	F2h; FEh; 02h;	F1h; F7h; FCh;	F9h; 01h; FDh;	FAh; 01h; 08h;	FBh; 07h; 07h;	F5h; FDh; 05h;	1481E8h
brown w/ green h.	12	F2h; FEh; 02h;	F1h; F7h; FCh;	F9h; 01h; FDh;	FAh; 01h; 08h;	FBh; 07h; 07h;	00h; 02h; 02h;	14820Ch
brown w/ green h.	13	F2h; FEh; 02h;	F1h; F7h; FCh;	F9h; 01h; FDh;	FAh; 01h; 08h;	FBh; 07h; 07h;	E1h; 02h; 02h;	148230h
brown w/ green h.	14	F2h; FEh; 02h;	F1h; F7h; FCh;	F9h; 01h; FDh;	FAh; 01h; 08h;	FBh; 07h; 07h;	E1h; 02h; 02h;	148254h
lightgreen	15	E4h; FFh; FEh;	E1h; FCh; FBh;	F5h; 03h; 00h;	0; 0; 0;	0; 0; 0;	F6h; 01h; 07h;	148278h
lightgreen	16	E4h; FFh; FEh;	E1h; FCh; FBh;	F5h; 03h; 00h;	0; 0; 0;	0; 0; 0;	0; 0; 0;	14829Ch
lightgreen	17	E4h; FFh; FEh;	E1h; FCh; FBh;	F5h; 03h; 00h;	0; 0; 0;	0; 0; 0;	E4h; 03h; 02h;	1482C0h
brown&green	18	E1h; F9h; F5h;	E1h; FDh; 00h;	E1h; 01h; FEh;	F9h; FBh; 01h;	F4h; F6h; 0Ah;	E1h; 02h; 02h;	1482E4h
brown	19	EFh; FFh; 00h;	E1h; FDh; FFh;	E9h; 05h; 08h;	00h; 00h; 08h;	F4h; F6h; 0Ah;	F8h; 01h; 07h;	148308h
brown	20	EFh; FFh; 00h;	E1h; FDh; FFh;	E9h; 05h; 08h;	00h; 00h; 08h;	F4h; F6h; 0Ah;	F9h; FBh; FBh;	14832Ch
brown	21	EFh; FFh; 00h;	E1h; FDh; FFh;	E9h; 05h; 08h;	00h; 00h; 08h;	F4h; F6h; 0Ah;	E4h; 03h; 02h;	148350h
brown	22	EFh; FFh; 00h;	E1h; FDh; FFh;	E9h; 05h; 08h;	00h; 00h; 08h;	F4h; F6h; 0Ah;	F9h; 01h; 06h;	148374h
brown&green	23	E1h; F9h; F5h;	E1h; FDh; 00h;	E1h; 01h; FEh;	F9h; FBh; 01h;	F4h; F6h; 0Ah;	F3h; FEh; 05h;	148398h
brown&green	24	E1h; F9h; F5h;	E1h; FDh; 00h;	E1h; 01h; FEh;	F9h; FBh; 01h;	F4h; F6h; 0Ah;	F9h; FBh; FBh;	1483BCh
brown&green	25	E1h; F9h; F5h;	E1h; FDh; 00h;	E1h; 01h; FEh;	F9h; FBh; 01h;	F4h; F6h; 0Ah;	E4h; 03h; 02h;	1483E0h
lightgreen w/ red h.	26	E4h; FFh; FEh;	E1h; FCh; FBh;	FBh; F8h; 04h;	0; 0; 0;	0; 0; 0;	0; 0; 0;	148404h
brown&green	27	E1h; F9h; F5h;	E1h; FDh; 00h;	E1h; 01h; FEh;	F9h; FBh; 01h;	F4h; F6h; 0Ah;	F9h; 01h; 06h;	148428h
brown w/ dark h.	28	EFh; FFh; 00h;	F4h; F7h; FAh;	01h; 01h; 01h;	00h; 00h; 08h;	F4h; F6h; 0Ah;	F9h; FBh; FBh;	14844Ch

## Patching the soldiers' colours on a Mac

If you try to find the same table in the source code (data-fork or resource-fork) of the Mac-version "A Bridge Too Far", you will fail. Searching for short three byte codes of the reverted RGB-format will reveal the correct position of this table: **starting point is 155D66hex in the data-fork** for the last available update (version 2.0b) or 1551A6hex for the first version and the demo program. But it is not a table of fixed size. That would be too easy. The colour values are some sort of compressed. The uncompressed format for each slot is: one length-byte (computed 20hex + length), Red-byte, Green-byte, Blue-byte, trailing-zeros-byte (containing the numbers of trailing zero-bytes, minimum is 1). Because the last three slots of each soldier definition contain only zero-bytes, the first act of compression occurs in the last slot: the last trailing zero-bytes counter is minimum 0Dhex (1 + 3\*4). The next step of compression is to save the space of leading zero-bytes. The predecesing trailing zero-bytes counter is set to higher value, the following length-byte is set to lower value and less colour values are in the slot. That is the reason why a patch of "A Bridge Too Far"'s soldier colour table could not take place in the same way as in the PC-version. Not all colour values can be changed. Analyzing the data-fork of "A Bridge Too Far" with a Hex-Editor shows the following result:

Close Combat 2 - A Bridge Too Far

File: A Bridge Too Far (updated to 2.0b)

Macintosh-version 2.0b analyzed using a HexEditor

Color	CplFiltH's	Cell-Format: (Length + 20h); Red; Green; Blue; how many following zero.bytes;						starting at
legs/body	Unif. No.	Body	Legs	Head	Belt	Boots	Weapon	Hex-Address
grey/grey	0	23h; FBh; FDh; FCh; 01h;	23h; FAh; FCh; FBh; 01h;	23h; 01h; 03h; 03h; 09h;	missing	missing	23h; F8h; F8h; F8h; 0Dh;	155D66h
grey/grey	1	23h; FBh; FDh; FCh; 01h;	23h; FAh; FCh; FBh; 01h;	23h; 01h; 03h; 03h; 09h;	missing	missing	23h; 01h; FBh; F9h; 0Dh;	155D7Ah
grey/grey	2	23h; FBh; FDh; FCh; 01h;	23h; FAh; FCh; FBh; 01h;	23h; 01h; 03h; 03h; 09h;	missing	missing	23h; 06h; 01h; F9h; 0Dh;	155D8Eh
grey&green	3	23h; F6h; F8h; F1h; 01h;	23h; FAh; FCh; FBh; 01h;	23h; FAh; 02h; FCh; 09h;	missing	missing	23h; 01h; FBh; F9h; 0Dh;	155DA2h
grey&green	4	23h; F6h; F8h; F1h; 01h;	23h; FAh; FCh; FBh; 01h;	23h; FDh; 03h; FFh; 09h;	missing	missing	23h; F8h; F8h; F8h; 0Dh;	155DB6h
grey&green	5	23h; F6h; F8h; F1h; 01h;	23h; FAh; FCh; FBh; 01h;	23h; FDh; 03h; FFh; 09h;	missing	missing	23h; 06h; 01h; F9h; 0Eh	155DCAh
brown	6	22h; FFh; EF; 01h;	23h; FFh; FDh; E1h; 01h;	23h; 08h; 05h; E9h; 01h;	21h; 08h; 03h;	23h; 0Ah; F6h; F4h; 01h;	23h; F8h; F8h; F8h; 0Dh;	155DDEh
darkgreen & green	7	23h; F6h; F8h; F1h; 01h;	23h; F2h; F7h; F3h; 01h;	23h; FDh; 03h; FFh; 09h;	missing	missing	23h; 01h; FBh; F9h; 0Dh;	155DF9h
darkgreen & green	8	23h; F6h; F8h; F1h; 01h;	23h; F2h; F7h; F3h; 01h;	23h; FDh; 03h; FFh; 09h;	missing	missing	23h; F8h; F8h; F8h; 0Dh;	155E0Dh
darkgreen & green	9	23h; F6h; F8h; F1h; 01h;	23h; F2h; F7h; F3h; 01h;	23h; FDh; 03h; FFh; 09h;	missing	missing	23h; 06h; 01h; F9h; 0Dh;	155E21h
darkgrey	10	23h; F6h; F6h; F6h; 01h;	23h; F6h; F6h; F6h; 01h;	23h; 01h; 01h; 01h; 09h;	missing	missing	23h; FFh; FFh; FFh; 0Dh;	155E35h
brown with green head	11	23h; 02h; FEh; F2h; 01h;	23h; FCh; F7h; F1h; 01h;	23h; FDh; 01h; F9h; 01h;	23h; 08h; 01h; FAh; 01h;	23h; 07h; 07h; FBh; 01h;	23h; 05h; FDh; F5h; 0Dh;	155E49h
brown with green head	12	23h; 02h; FEh; F2h; 01h;	23h; FCh; F7h; F1h; 01h;	23h; FDh; 01h; F9h; 01h;	23h; 08h; 01h; FAh; 01h;	23h; 07h; 07h; FBh; 01h;	22h; 02h; 02h; 0Eh;	155E67h
brown with green head	13	23h; 02h; FEh; F2h; 01h;	23h; FCh; F7h; F1h; 01h;	23h; FDh; 01h; F9h; 01h;	23h; 08h; 01h; FAh; 01h;	23h; 07h; 07h; FBh; 01h;	23h; 02h; 02h; E1h; 0Dh;	155E84h
brown with green head	14	23h; 02h; FEh; F2h; 01h;	23h; FCh; F7h; F1h; 01h;	23h; FDh; 01h; F9h; 01h;	23h; 08h; 01h; FAh; 01h;	23h; 07h; 07h; FBh; 01h;	23h; 02h; 02h; E1h; 0Dh;	155EA2h
lightgreen	15	23h; FEh; FFh; E4h; 01h;	23h; FBh; FCh; E1h; 02h;	22h; 03h; F5h; 09h;	missing	missing	23h; 07h; 01h; F6h; 0Dh;	155EC0h
lightgreen	16	23h; FEh; FFh; E4h; 01h;	23h; FBh; FCh; E1h; 02h;	22h; 03h; F5h; 19h;	missing	missing	missing	155ED3h
lightgreen	17	23h; FEh; FFh; E4h; 01h;	23h; FBh; FCh; E1h; 02h;	22h; 03h; F5h; 09h;	missing	missing	23h; 02h; 03h; E4h; 0Dh;	155EE1h
brown&green	18	23h; F5h; F9h; E1h; 02h;	22h; FDh; E1h; 01h;	23h; FEh; 01h; E1h; 01h;	23h; 01h; FBh; F9h; 01h;	23h; 0Ah; F6h; F4h; 01h;	23h; 02h; 02h; E1h; 0Eh;	155EF4h
brown	19	22h; FFh; EFh; 01h;	23h; FFh; FDh; E1h; 01h;	23h; 08h; 05h; E9h; 01h;	21h; 08h; 03h;	23h; 0Ah; F6h; F4h; 01h;	23h; 07h; 01h; F8h; 0Eh;	155F11h
brown	20	22h; FFh; EFh; 01h;	23h; FFh; FDh; E1h; 01h;	23h; 08h; 05h; E9h; 01h;	21h; 08h; 03h;	23h; 0Ah; F6h; F4h; 01h;	23h; FBh; FBh; F9h; 0Eh;	155F2Ch
brown	21	22h; FFh; EFh; 01h;	23h; FFh; FDh; E1h; 01h;	23h; 08h; 05h; E9h; 01h;	21h; 08h; 03h;	23h; 0Ah; F6h; F4h; 01h;	23h; 02h; 03h; E4h; 0Eh;	155F47h
brown	22	22h; FFh; EFh; 01h;	23h; FFh; FDh; E1h; 01h;	23h; 08h; 05h; E9h; 01h;	21h; 08h; 03h;	23h; 0Ah; F6h; F4h; 01h;	23h; 06h; 01h; F9h; 0Dh;	155F62h
brown&green	23	23h; F5h; F9h; E1h; 02h;	22h; FDh; E1h; 01h;	23h; FEh; 01h; E1h; 01h;	23h; 01h; FBh; F9h; 01h;	23h; 0Ah; F6h; F4h; 01h;	23h; 05h; FEh; F3h; 0Dh;	155F7Dh
brown&green	24	23h; F5h; F9h; E1h; 02h;	22h; FDh; E1h; 01h;	23h; FEh; 01h; E1h; 01h;	23h; 01h; FBh; F9h; 01h;	23h; 0Ah; F6h; F4h; 01h;	23h; FBh; FBh; F9h; 0Dh;	155F9Ah
brown&green	25	23h; F5h; F9h; E1h; 02h;	22h; FDh; E1h; 01h;	23h; FEh; 01h; E1h; 01h;	23h; 01h; FBh; F9h; 01h;	23h; 0Ah; F6h; F4h; 01h;	23h; 02h; 03h; E4h; 0Dh;	155FB7h
lightgreen with red head	26	23h; FEh; FFh; E4h; 01h;	23h; FBh; FCh; E1h; 01h;	23h; 04h; F8h; FBh; 19h;	missing	missing	missing	155FD4h
brown&green	27	23h; F5h; F9h; E1h; 02h;	22h; FDh; E1h; 01h;	23h; FEh; 01h; E1h; 01h;	23h; 01h; FBh; F9h; 01h;	23h; 0Ah; F6h; F4h; 01h;	23h; 06h; 01h; F9h; 0Eh;	155FE3h
brown with dark head	28	22h; FFh; EFh; 01h;	23h; FAh; F7h; F4h; 01h;	23h; 01h; 01h; 01h; 01h;	21h; 08h; 03h;	23h; 0Ah; F6h; F4h; 01h;	23h; FBh; FBh; F9h; 08h;	156000h

Zero-bytes are not written if they are at the beginning or at the end of each colour definition “slot”. If the starting byte (for the colour Red) is zero, the **length byte** is shrunk down and the definition starts with the next colour (Green). If the trailing byte (for the colour Blue) is zero, the **counter for the trailing zero-bytes** is incremented and the last byte is left. If an entire colour definition consists completely of zero-bytes, then the predecessor definition has a greater counter for the trailing zero-bytes. Consequences for patching the table of the Mac-version:




- do not change the length of each entry, do not change the length bytes and the counters for the zero-bytes!
- do not change the length of the whole table.
- if you want to remove the grey-colour for the German soldiers (Afrika-Mod, PacificFront-Mod), the colours of Belts and Boots can not be changed.
- it is not recommended to change the weapons' colour for WW2-mods.

The patching of the values in the data-fork of “A Bridge Too Far” can be done with any Hex-Editor on a Mac. The necessary values can be obtained by using CPLFILTH's tool on a PC or by another way, which CPLFILTH published at the discussion forum at Close Combat HQ ([www.sonic.net/~lairross/closecombat/](http://www.sonic.net/~lairross/closecombat/)) (June 10<sup>th</sup>, 2001)<sup>1</sup>:

Take your favorite graphics editor and load a picture which contains the colour(s) you are looking for. Use the colour picker tool to determine the RGB-values in percentage of the intended colour. Due to the fact that the range for an unsigned 5-bit short-integer is only 0..63 is the next step the multiplying of the RGB-percentage values with 64. The result is a value in the range 0..63. To convert it into a signed 5-bit short-integer you must subtract 31 from this value. The result is now in the range -31..32. This result is a value which can be used directly in the PC-tool “SldColor.Exe”. For use with a Hex-Editor the result must be converted into a hex-value, ranging from E1hex (what stands for -31) to 1Fhex (what stands for 31).

## New soldiers' colours for the CC2-Afrika-Mod

Example: new uniform colours for the German Afrika-Korps for our CC2-Afrika-Mod

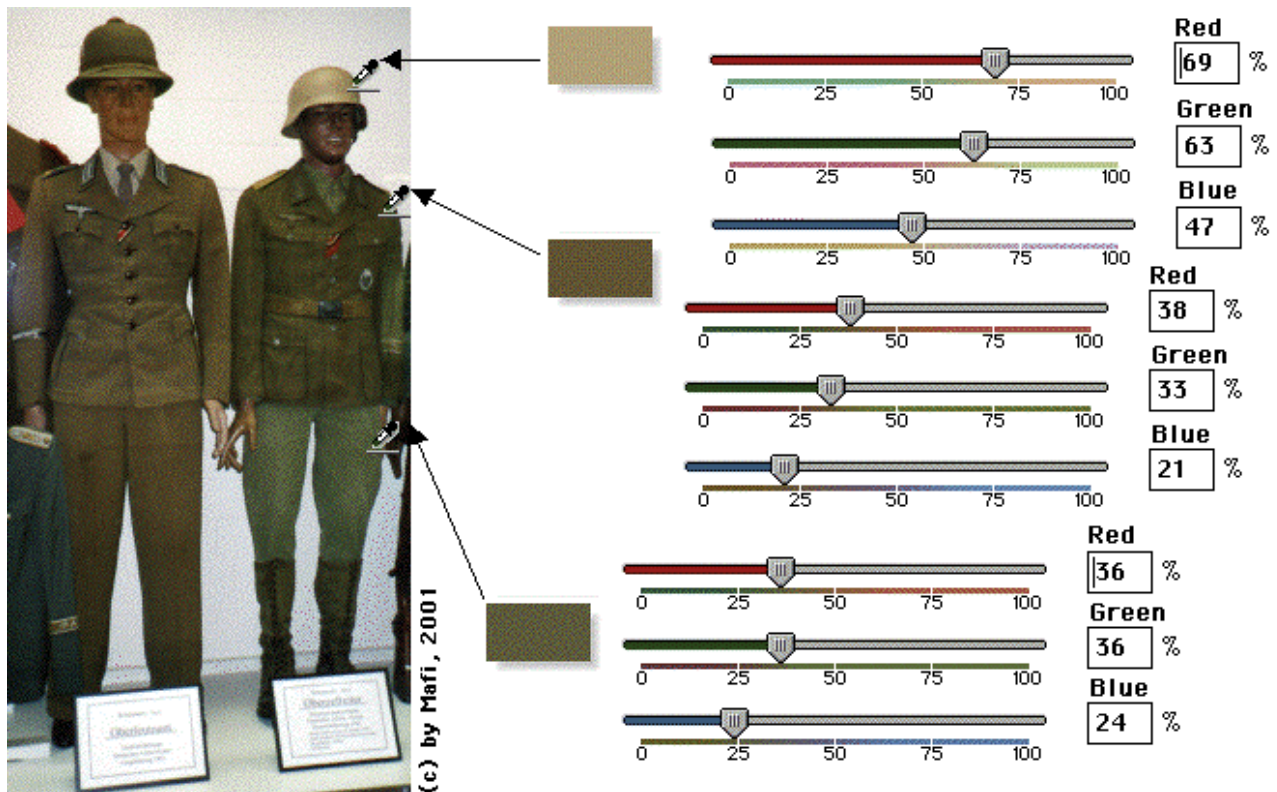
	Body 			Legs 			Head 		
RGB	Red	Green	Blue	Red	Green	Blue	Red	Green	Blue
intended RGB-value	38 %	33 %	21%	36 %	36 %	24 %	69 %	63 %	47 %
multiplying with 64	24.3	21.1	13.4	23.0	23.0	15.4	44.2	40.3	30.1
subtracting 31	-6.7	-9.9	-17.6	-8.0	-8.0	-15.6	13.2	9.3	-0.9
rounded short-int	-7	-10	-18	-8	-8	-16	13	9	-1
hex-value	F9h	F6h	Eeh	F8h	F8h	F0h	0Dh	0Ah	FFh

<sup>1</sup> There's three sliders, one for red, green and blue each. They range from -31 to 31. The way the game handles the uniform colors is roughly as follows: The soldier and soldierB files contain two images (rather diabolically encoded, I might add, Konrad figured them out) for each frame of soldier animation, a grayscale one (approximately a lightmap) and a mask, where each bodypart is a different color. The color for each pixel of a particular uniform is then calculated from the grayscale image and the three variables (the ones you can set with the sliders) for each part of the body by adding the value of each variable to the 5bit (0-32, as opposed to 0-255 for 8bit) color component value of a pixel from the grayscale image. Simple, is it not ?

A good way to find out how you can get a particular color is to use a color picker in pretty much any paint program. Get the color you want, and then examine it's color components. Now, if you want tan ( let's say it's 200,120,30) you can look at the values and see red has the largest effect, and blue the smallest. So set the red to a positive value and blue to negative. Then it's just a case of finetuning 'till you have the desired shade.

I don't BTW even know which soldier number in the tool corresponds to which uniform type in soldiers.txt/adb, I seem to recall someone had made a chart detailing that, but can't remember where I saw it. I think Blabsky has played around with them, he might know.





Picture: uniforms of the German Afrika-Korps as shown in the Tank Museum at Munster (Germany, photo by Mafi 2001).

The changes can be done on a PC with “SldColor.Exe”:

Close Combat 2 - A Bridge Too Far

File: CC2.Exe (updated to v2.0b)

PC-version 2.0b patched using SldColor.Exe for the CC2-Afrika-Mod

Color	CplFiltH's	Screen-Display: Blue; Green; Red; .....						Group
legs/body	Uniform No.	Body	Legs	Head	Belt	Boots	Weapon	
darkbrown/darkgreen	0	-17; -11; -9;	-17; -5; -2;	-14; 0; 4;	0; 0; 0;	0; 0; 0;	-8; -8; -8	Italian army
darkbrown/darkgreen	1	-17; -11; -9;	-17; -5; -2;	-14; 0; 4;	0; 0; 0;	0; 0; 0;	-7; -5; 1;	Italian army
darkbrown/darkgreen	2	-17; -11; -9;	-17; -5; -2;	-14; 0; 4;	0; 0; 0;	0; 0; 0;	-7; 1; 6;	Italian army
green&brown	3	-18; -10; -7	-16; -8; -8;	-1; 10; 13;	0; 0; 0;	0; 0; 0;	-7; -5; 1;	DAK
green&brown	4	-18; -10; -7	-16; -8; -8;	-1; 10; 14;	0; 0; 0;	0; 0; 0;	-8; -8; -8	DAK
green&brown	5	-18; -10; -7	-16; -8; -8;	-1; 10; 14;	0; 0; 0;	0; 0; 0;	-7; 1; 6;	DAK

And on a Mac with a Hex-Editor “by hand”:

Close Combat 2 - A Bridge Too Far

File: A Bridge Too Far (updated to 2.0b)

Macintosh-version 2.0b analyzed using a HexEditor

Color	CplFiltH's	Cell-Format: (Length + 20h); Red; Green; Blue; how many following zero.bytes;						starting at Hex-Address
legs/body	Unif. No.	Body	Legs	Head	Belt	Boots	Weapon	
darkbrown/darkgreen	0	23h; F7h; F5h; EFh; 01h;	23h; FEh; FBh; EFh; 01h;	23h; 04h; 00h; F2h; 09h;	missing	missing	23h; F8h; F8h; F8h; 0Dh;	155D66h
darkbrown/darkgreen	1	23h; F7h; F5h; EFh; 01h;	23h; FEh; FBh; EFh; 01h;	23h; 04h; 00h; F2h; 09h;	missing	missing	23h; 01h; FBh; F9h; 0Dh;	155D7Ah
darkbrown/darkgreen	2	23h; F7h; F5h; EFh; 01h;	23h; FEh; FBh; EFh; 01h;	23h; 04h; 00h; F2h; 09h;	missing	missing	23h; 06h; 01h; F9h; 0Dh;	155D8Eh
green&brown	3	23h; F9h; F6h; EEh; 01h;	23h; F8h; F8h; F0h; 01h;	23h; 0Dh; 0Ah; FFh; 09h;	missing	missing	23h; 01h; FBh; F9h; 0Dh;	155DA2h
green&brown	4	23h; F9h; F6h; EEh; 01h;	23h; F8h; F8h; F0h; 01h;	23h; 0Eh; 0Ah; FFh; 09h;	missing	missing	23h; F8h; F8h; F8h; 0Dh;	155DB6h
green&brown	5	23h; F9h; F6h; EEh; 01h;	23h; F8h; F8h; F0h; 01h;	23h; 0Eh; 0Ah; FFh; 09h;	missing	missing	23h; 06h; 01h; F9h; 0Eh;	155DCAh



Picture: old and new colours for the Afrika-Mod.

I hope this will helps.

Mafi

October 2<sup>nd</sup>, 2001

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<http://homepage.mac.com/closecombat2/>