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CODING OF MOVING PICTURES AND ASSOCIATED AUDIO

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Title: Frame-Based Field/Frame Adaptive Coding
(The proposal package of pre-registration #11)

Features

* Frame-based structure
  Three types of pictures (Intra-coded (I) picture, Predictive-coded (P) picture and Bidirectionally predictive-coded (B) picture). Simple prediction structure and architecture. No need to consider the structure of fields.
* Almost the same syntax and macroblock structure as MPEG1
  A macroblock (16×16 pels) consists of 6 blocks. A block consists of 8×8 pels, is transformed with a 2-dimensional DCT. Motion Compensation is executed based on macroblock. Slice, macroblock and block layers in MPEG1 are slightly modified and used.
* Strength frame/field predictions for interlaced video
  Two major macroblock types in I-pictures. Five major macroblock types in P-pictures. The same macroblock types in B-pictures as MPEG1. Two block arrangements selectable for frame/field codings.
* Vertical/zigzag scanning order
  Two types of scanning order "vertical" and "zigzag" whose switching is valid to interlaced video coding. Each coded macroblock has a bit to indicate scanning order.
* Dynamic Huffman coding
  The events of the run and level of the DCT coefficients, End Of Block (EOB) and Escape are encoded with dynamic Huffman coding which provides extremely high compression rate.
* MC in the half-pel positions
  MC in the half-pel positions has two types. One is the same as MPEG1, the other type has good quality in high frequency.

1 Frame and field

In this proposed coding scheme, a "picture" is a "frame" which has interlaced lines grouped into two consecutive "fields". In this document "even field" and "odd field" mean even numbered lines and odd numbered lines in a frame, respectively (Fig. 1). Therefore, alternate lines in a picture belong to even or odd field.

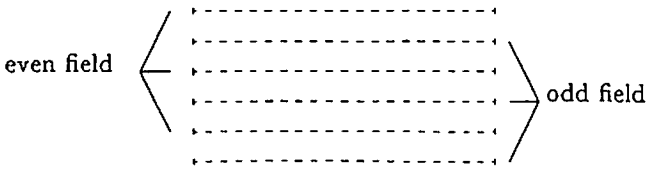
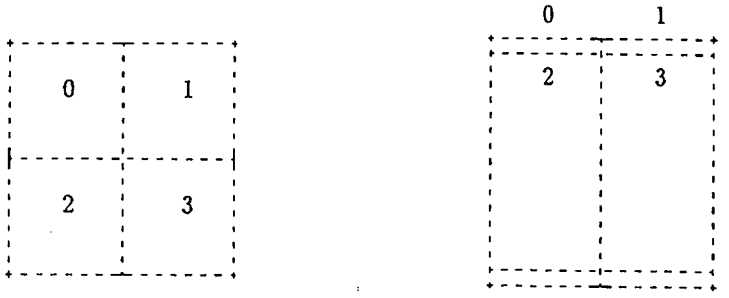


Fig. 1. Even and odd field arrangement in a frame.

2 Block arrangement in a macroblock

A macroblock (16×16) consists of 4 luminance blocks (Y) and 2 chrominance blocks (Cb, Cr), is a unit of MC. Each block consists of 8×8 pels, and is transformed with a 2-dimensional DCT. There are two types of luminance block arrangement in a macroblock for interlaced video coding. One type named frame-based is the same as MPEG1 (Fig. 2 (a)), the other depicted in Fig. 2 (b) is a field-based arrangement.



(a) Frame-based arrangement (b) Field-based arrangement

Fig. 2. Block arrangements of Y component in a macroblock.

In field-based arrangement, even lines belong to the 0th or first block, and odd lines belong to the second or third block. The 0th and first blocks are called even blocks, the second and third blocks are called odd blocks, respectively.

Frame-based block arrangement is used for frame-based prediction having the same prediction structure as MPEG1. Field-based block arrangement is for field-based prediction.

For still area, frame-based arrangement is efficient in encoding. On the other hand, field-based arrangement is efficient for motion area.

In I- and P-pictures macroblock types can indicate whether the block arrangement in a macroblock is a field-based or frame-based arrangement. In B-pictures all macroblock types are the same as MPEG1 and the predictions are frame-based, but each macroblock has a "field/frame" bit, after macroblock type and before block layer, to decide whether it is field-based or frame-based coding.

3 Prediction

Frame-based predictions can be classified into two types: "parallel" and "cross" by the even or odd of vertical component of motion vector(Fig. 3). This will be one of the reasons of the strength of frame-based prediction. Frame-based prediction provides both of inter-fields prediction and inter-frames prediction. In Fig. 3 an arrow (→) denotes a prediction, and "e" and "o" mean even and odd fields respectively.

(a) "parallel" (b) "cross"

Fig. 3. Two types of frame-based prediction.

Three field-based predictions introduced in this proposal are shown in Fig. 4. Each prediction type corresponds to one of the macroblock types in I- or P-pictures. The type "*" is even blocks are coded intra-field and odd blocks are predicted from (reconstructed) even field. The type "t" is even blocks are predicted from another frame, odd blocks are predicted from even field. The type "p" is even and odd blocks separately predicted from another frame. Types "t" and "p" have not only parallel mode but also cross mode according to vertical component of motion vector because the reference picture is a frame.

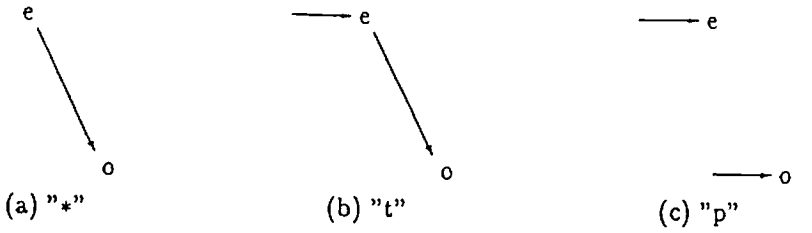


Fig. 4. Three types of field-based prediction.

4 Macroblock types

1) In I-pictures there are two major macroblock types which can be divided into 4 by "+Q/not" bit.

(1-1) "*" (+Q)
Even blocks are intra-field coded and odd blocks are predicted from even field (Fig. 4(a)) (Field-based block arrangement).

(1-2) "I" (+Q)
Blocks in a macroblock are all intra-coded. It is the same macroblock type as MPEG1 (Frame-based block arrangement).

2) In P-pictures there are 5 major macroblock types which can be divided into 13 by coded/not bit and (if coded type) +Q/not bit.

(2-1) "P" +c/n (+Q)
Blocks in a macroblock are all predictive-coded. It has the same prediction structure as MPEG1(Frame-based block arrangement).

(2-2) "p" +c/n (+Q)
Even and odd blocks are independently predicted from the past frame which is a I- or P-picture. This type of macroblock has two motion vectors for even and odd blocks (Fig.4 (c))(Field-based block arrangement).

(2-3) "t" +c/n (+Q)
Even blocks are predicted from the past frame(I- or P-picture). Odd blocks are predicted from even field (Fig.4 (b))(Field-based block arrangement).

(2-4) Others (I and *)
The same prediction as "I" and "*" in I-pictures, respectively. (The VLC's of "I" and "*" are different from those in I-pictures.)

Note: The type (2-1) includes some of the macroblock types of P-pictures in MPEG1. For simplifying the macroblock and block layer, we deleted the coded block pattern (CBP) and non-MC type in MPEG1.

3) In B-pictures there are the same macroblock types as MPEG1.
Eleven macroblock types could be grouped into 4 directional types, Intra, Forward, Backward and Interpolative as follow: (The suffix "+c/n (+q)" is the same extension as that in P-picture.)

(3-1) Intra (+Q)

(3-2) Forward +c/n (+Q)

(3-3) Backward +c/n (+Q)

(3-4) Interpolated +c/n (+Q)

But the same VLC's for the macroblock types as MPEG1 are used. Although all predictive types in B-pictures are frame-based prediction, they have "field/frame" bit which selects the block arrangement.

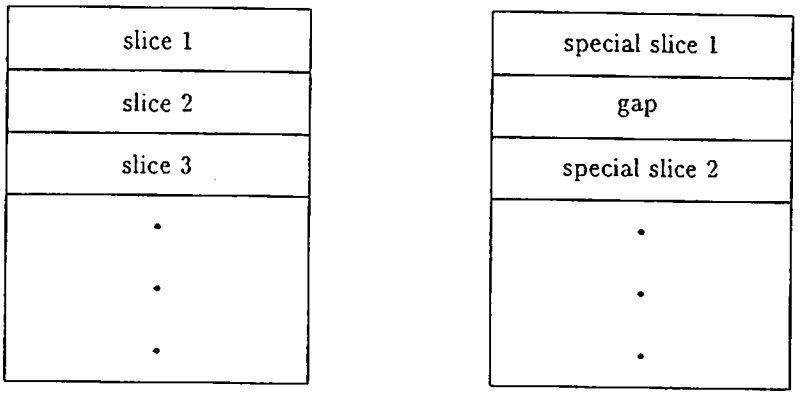
5 Special slices

Coding syntax is almost the same as MPEG1 syntax except for the scheme needed for interlaced video coding.

In the coding or decoding of "*" and "t" types, odd blocks are predicted and coded after all even blocks in a picture are processed. We call this process "delayed process (DP)". In DP, identification of slice headers is needed since the encoder resets MV value at the slice headers. This type of slice is called a "special slice". In DP, macroblock types "t" and "*" which have "intra-frame and inter-fields prediction" are provided.

There is a different definition for the special slice as follows:

1) Empty slice is not admitted, i.e. special slices may have gaps (Fig. 5).
2) In special slices, there are a MV and two odd blocks per macroblock. Neither macroblock_address_increment nor macroblock types are included in special slices.
3) In DP there is no difference whether generated from I- or P-pictures, or from "*" or "t" type of macroblock.
4) The quantizer scale of slice header (SQUANT) equals "0" means it is a special slice. Other items of slice header are the same as the normal slices.



(a) Former process (b) Delayed process

Fig. 5. Special slices and gaps.

Slice 2 has no macroblocks whose types are "t" nor "*".

6 Vertical/zigzag scanning order switching

Two types of scanning order of DCT coefficients can be selected. One is the same zigzag scanning order as MPEG1 (Fig. 6 (b)), the other is vertical "down and up" scanning (Fig. 6 (a)). Before block layer, all macroblock types in all picture types have a "vertical/zigzag" bit to select the scanning order. In DP, only vertical scanning order is used, there is no vertical/zigzag bit.

0	15	16	31	32	47	48	63
1	14	17	30	33	46	49	62
2	13	18	29	34	45	50	61
3	12	19	28	35	44	51	60
4	11	20	27	36	43	52	59
5	10	21	26	37	42	53	58
6	9	22	25	38	41	54	57
7	8	23	24	39	40	55	56

(a) Vertical scanning

0	1	5	6	14	15	27	28
2	4	7	13	16	26	29	42
3	8	12	17	25	30	41	43
9	11	18	24	31	40	44	53
10	19	23	32	39	45	52	54
20	22	33	38	46	51	55	60
21	34	37	47	50	56	59	61
35	36	48	49	57	58	62	63

(b) Zigzag scanning

Fig. 6. Scanning order.

7 Dynamic Huffman coding

To encode the events of EOB, Escape and run and level of DCT coefficients, Dynamic Huffman coding is used in this proposal, which differs from the original one ([1]) in some respects.

1) Leaf nodes of Huffman tree
The run and level, EOB and Escape events correspond to the leaves of Huffman tree. This correspondence is the same as that in MPEG1 except the "dct_coeff_first" and "dct_coeff_next" (run = 0, level = 1) events which are dealt with as the same event in this scheme.

2) Initial frequency values of leaf nodes
The number of events is 114 (including one dummy event) the same as MPEG1. The frequency of each event is initially set so that the form of Huffman tree is equivalent to that in MPEG1. Therefore, the coding length of each event is the same as MPEG1 before changing Huffman tree. Dynamic Huffman tree is initialized at every entry point (sequence header before every GOP).

3) Method of changing Huffman tree
At every occurrence of events, the frequency of events is incremented by three. By the increment by three, shorter code is assigned to the leaf nodes corresponding to the events in comparison to the case of the increment by one.

4) Reconstruction of Huffman tree
The dynamic Huffman tree is reconstructed when the number of occurrence of events reaches 18304/6 times. The frequency of root of the initial tree is 18304. The method of reconstructing the Huffman tree is as follows.

Let the interval between the reconstructions of tree be a process. The initial frequency of each event for the next process is the value which is obtained by subtracting the initial frequency of each event in the current process from the final frequency. Moreover, the frequency of every event is increased by one to avoid zero value. On the basis for the initialized frequency, the Huffman tree is reconstructed.

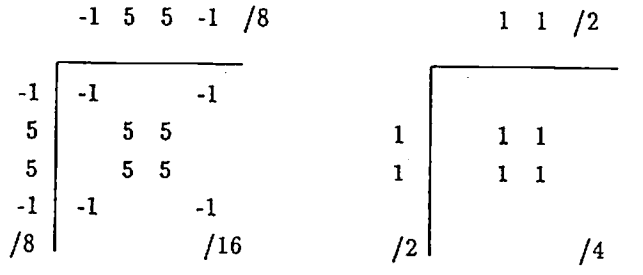
5) Escape code
The Escape code itself is one of dynamically varying Huffman codes but the Fixed Length Code (FLC) (for the run and level) following Escape code is the same as MPEG1.

$$\underset{(dynamic\ Huffman\ code)}{Escape\ code} + \underset{(the\ same\ code\ as\ MPEG1)}{FLC}$$

6) Avoiding start code emulation
To avoid start code emulation, if there are consecutive 11 zero's in one code of the run and level (including sign bit), EOB or Escape (including FLC), "1" bit is inserted after the 11th bit as follows:
Exp. 1: "0000 0000 000" → "0000 0000 0001"
Exp. 2: "0000 0000 0000"→ "0000 0000 0001 0"
Exp. 3: "0000 0000 0001"→ "0000 0000 0001 1"

8 MC in the half-pel positions

MC in the half-pel positions has two types. One type which is the same as MPEG1 (Fig. 7 (b)) is used for I- and P-pictures except DP, the other type which utilizes maximum 8 integer-pel values (Fig. 7 (a)) is used for B-pictures and DP.



(a) 8 integer-pel type (b) 4 integer-pel type

Fig.7 Integer-pel positions and their values
used for MC in the half-pel positions

9 Miscellaneous

1) Group Of Picture (GOP) structure
Each GOP consists of 12 pictures (the number of P-pictures is 12, the number of B-pictures is 3). Picture series in a GOP is " B B I B B P B B P B B P ".

2) MV detection
Telescopic searching described in SM3 is used.

3) Rate control
Three integer values "i_step', "p_step" and 'b_step" are stepsizes which are used for rate control. i_step, p_step and b_step are for I-, P- and B-pictures, respectively. Three values are initialized at the total head position of one sequence. i_step and p_step are set to 14 at 4 Mb/s and 8 at 9 Mb/s. b_step is set to 32 at 4 Mb/s and 16 at 9 Mb/s.

These step size values are divided by two and used as SQUANT which is not changed through one picture. At the end of one picture, one of the step size values is updated as follows:

Let Bitrate= 8955000(for 9 Mb/s) or 3980000(for 4 Mb/s). Let last_i, last_p, and last_b be generated code bits from the last I-, P- and B-picture.

```
rate= BitRate*12/( (last_i + last_p*3 + last_b*8 )*30 );
step= (int)(step/rate/2+.5)*2;
```

Trim the value to preserve following relations.

$$
\begin{aligned}
i\_step &\leq (b\_step - 2) \\
p\_step &\leq (b\_step - 2) \\
step &\geq min\_step \\
step &\leq 62
\end{aligned}
$$

4) Macroblock quantization (MQUANT) control
MQUANT is calculated from SQUANT and the standard deviation of the 256 luminance values of the input macroblock as follows:

```
mq1= (int)(sqrt((double)std)*sq/10)*2;
if( mq1< sq/3*2+2 ) mq1=sq/3*2+2;
if( mq1> sq*2 )     mq1=sq*2;
if( mq1<min_step )  mq1=min_step;
if( mq1>62 )        mq1=62;
if( mq-2 <= mq1 && mq1 <= mq+2 )mq1=mq;
mq= mq1;
```

where "sq" is SQUANT×2. "mq1" is a candidate of "mq". "mq" is MQUANT×2. "std" is a standard deviation of the input luminance in the macroblock. "min_step" is initially set to 6 or 4 (depending on 4 Mb/s or 9 Mb/s).
In DP, MQUANT is translated from the former process.

5) Quantization matrix
For all sequences, one pair of quantize matrices is used (Fig. 8).

16	16	18	20	22	24	26	32
16	16	18	22	24	26	32	34
18	18	20	22	26	32	34	36
18	20	22	24	26	34	36	38
19	22	24	26	32	36	38	40
20	23	24	28	34	38	40	44
22	24	26	32	36	40	44	48
24	26	28	34	38	44	48	64

(a) intra_quant

16	16	16	18	20	22	23	24
16	16	18	18	21	23	24	25
16	16	18	20	22	24	25	26
16	16	20	21	22	25	26	27
17	18	21	22	23	26	27	28
18	20	22	23	25	27	28	29
19	21	23	25	27	28	29	30
20	22	25	27	28	29	30	32

(b) non_intra_quant

Fig. 8 Quantization matrices.

6) Border B-pictures of the GOP
In B-pictures before the I-picture in one GOP, we have defined one constrained selection of macroblock types which forbid interpolative prediction because the interpolation in these pictures often darken the textures as the wall of Table Tennis sequence. The reason will be the texture changes of newly coded I-picture from the texture of the last P-picture in the old GOP.

7) Gamma and its inverse characteristics
In the Flower Garden sequence, flicker phenomenon arises. This phenomenon is caused by the fact that Gamma characteristic is given to the image sequence. To remove flicker, the nonlinearity of inverse Gamma characteristic is applied to the luminance of input pictures, and Gamma characteristic is applied to the output pictures. (This processing is only done in the Flower Garden sequence.)

The Gamma and its inverse processing is done by table looking up. The tables of Gamma t1[i] and its inverse t2[i] are calculated as follows:

```
itable()
{
int      i;
for(i=0;i<16;i++)    t1[i]= 0;
for(i=16;i<256;i++) t1[i]= (i-16)*(i-16)/224.+ 0.5;
for(i=0;i<256;i++)  t2[i]= sqrt(i*224.)+16.5;
}
```

8) Two Chrominance Blocks
The number of blocks in a macroblock is equal to MPEG1 as described in the chapter 2, which could be interpreted as 4:2:0, but we use averaging chrominance data of even and odd fields.

9) Summary of macroblock types

Table 1. Macroblock types in I-picture

Type	No.of MV's exc.DP	No.of MV's in DP	VLC
*	0	1	1
*+Q	0	1	01
I	0	0	001
I+Q	0	0	0001

+ vertical/zigzag + 4 blocks for type "* + 2 blocks in DP,
or + 6 blocks for type "I".

Table 2. Macroblock types in P-picture

Type	No.of MV's exc.DP	No.of MV's in DP	VLC		
p	2	0	1	c/n	(+Q/n)
t	1	1	01	c/n	(+Q/n)
P	1	0	001	c/n	(+Q/n)
*	0	1	0001		+Q/n
I	0	0	00001		+Q/n

+ vertical/zigzag + 4 blocks for type "t" or "*" + 2 blocks in DP
or + 6 blocks for type "P", "p" or "I".

Table 3. Macroblock types in B-picture

The same macroblock types and VLC's as MPEG1

+ field/frame + vertical/zigzag + 6 blocks.

10 Syntax diagram

The video multiplex is arranged in a hierarchical structure with six layers, which is almost the same arrangement as MPEG1. The layers are: video sequence layer, GOP layer, picture layer, slice layer, macroblock layer and block layer. Syntax diagrams of video sequence layer, GOP layer, picture layer and slice layer are exactly the same as those of MPEG1, respectively.

The meaning of "quantizer_scale" in slice layers is different from MPEG1. In delayed process the macroblock quantize value is transmitted from the former process of the each macroblock. In this case "quantizer scale" is present to indicate whether the current slice is in the former process or delayed process, i.e. "quantizer_scale" is set to "0" in the delayed process and a non-zero value in the former process.

Macroblock and block layers in MPEG1 are partly modified and used in this proposal. There are two macroblock layers. One macroblock layer is almost the same structure as MPEG1, but "field/frame" and "vertical/zigzag" bits are newly introduced in this proposal.

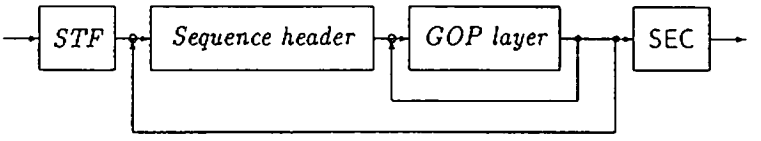
A "field/frame" bit is present only for B-pictures. For the other pictures, this bit is not present in the bit stream, the macroblock type itself is also the alternate of a "field/frame" bit. This bit indicates whether the block arrangement in the current macroblock is a frame-based or field-based.

A "vertical/zigzag", indicates which scanning order is used vertical or zigzag, is always present in the bit stream.

The other macroblock layer is present only for the delayed process in I- and P-pictures. Because the delayed process is field-based processing, there is not a "field/frame" bit in this macroblock layer. Furthermore, there is not a "vertical/zigzag" bit either because vertical scanning is only used in the delayed process.

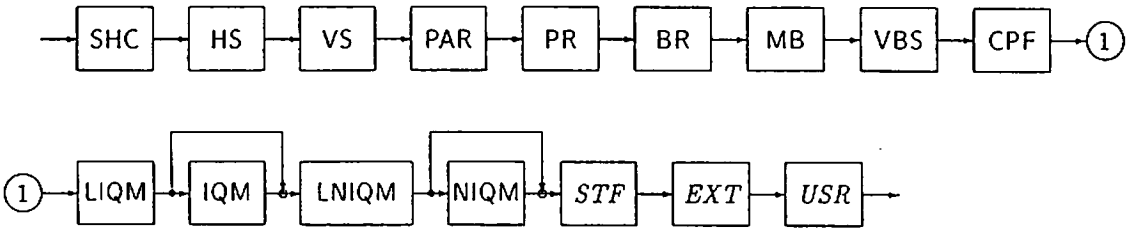
Block layer is modified for Huffman coding. EOB and the run and level are encoded with dynamic Huffman coding except DC coefficients in intra-coded macroblock encoded in the same way as MPEG1.

A syntax diagram of the video multiplex coder is shown in Fig. 9.



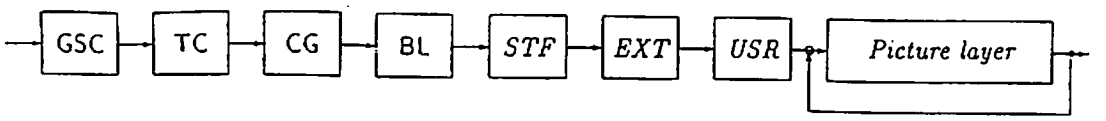
SEC: sequence_end_code

(a) Video sequence layer



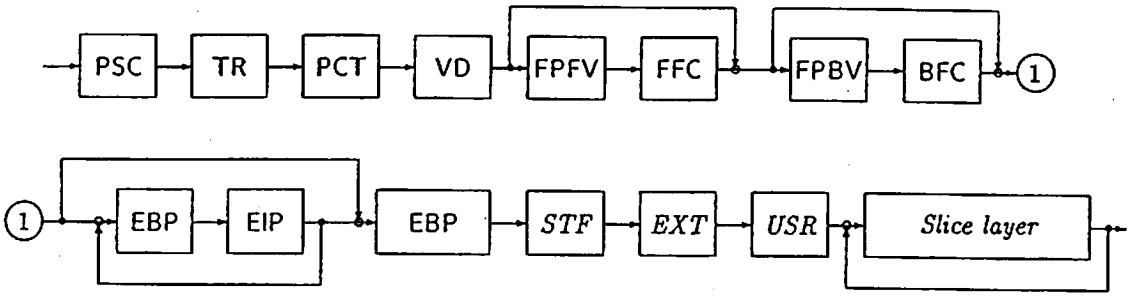
SHC: sequence_header_code
HS: horizontal_size
VS: vertical_size
PAR: pel_aspect_ratio
PR: picture_rate
BR: bit_rate
MB: marker_bit
VBS: vbv_buffer_size
CPF: constrained_parameter_flag
LIQM: load_intra_quantizer_matrix
IQM: intra_quantizer_matrix
LNIQM: load_non_intra_quantizer_matrix
NIQM: non_intra_quantizer_matrix

(b) Sequence header



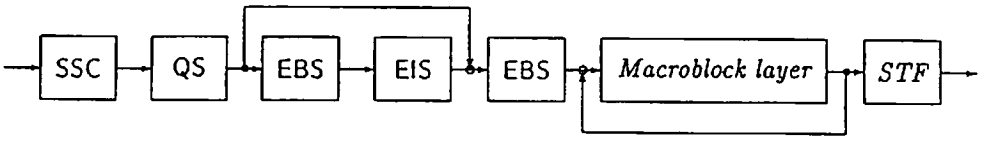
GCS: group_start_code
TC: time_code
CG: closed_gop
BL: broken_link

(c) GOP layer



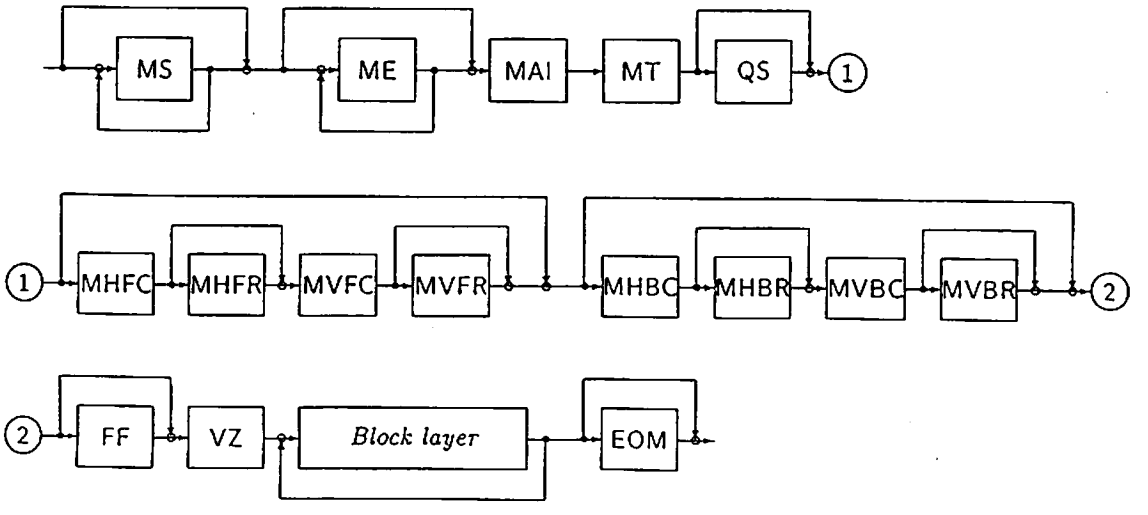
PSC: picture_start_code
TR: temporal_reference
PCT: picture_coding_type
VD: vbv_delay
FPFV: full_pel_forward_vector
FFC: forward_f_code
FPBV: full_pel_forward_vector
BFC: backward_f_code
EBP: extra_bit_picture
EIP: extra_information_picture

(d) Picture layer



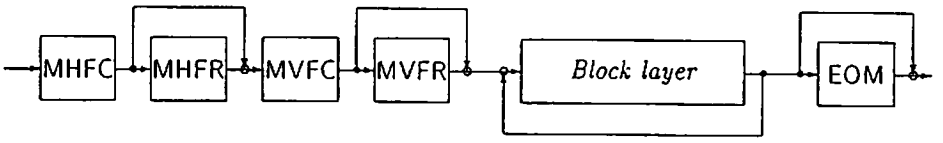
SSC: slice_start_code
QS: quantizer_scale
EBS: extra_bit_slice
EIS: extra_information_slice

(e) Slice layer

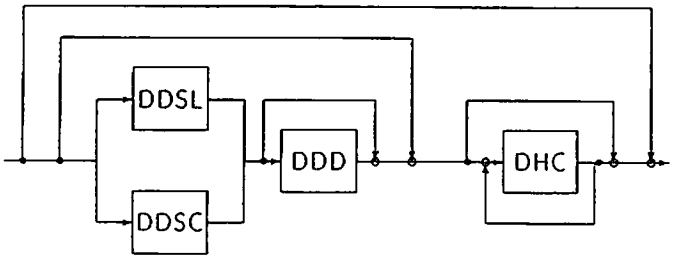


MS: macroblock_stuffing
ME: macroblock_escape
MAI: macroblock_address_increment
MT: macroblock_type
QS: quantizer_scale
MHFC: motion_horizontal_forward_code
MHFR: motion_horizontal_forward_r
MVFC: motion_vertical_forward_code
MVFR: motion_vertical_forward_r
MHBC: motion_horizontal_backward_code
MHBR: motion_horizontal_backward_r
MVBC: motion_vertical_backward_code
MVBR: motion_vertical_backward_r
EOM: end_of_macroblock
FF: a "frame/field" bit
VZ: a "vertical/zigzag" bit

(f) Macroblock layer

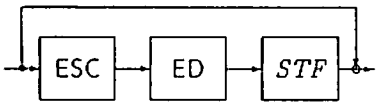


(g) Macroblock layer (in DP)



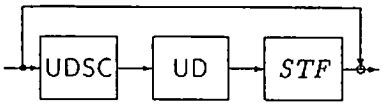
DDSL: dct_dc_size_luminance
DDSC: dct_dc_size_chrominance
DDD: dct_dc_differential
DHC: dynamic Huffman code

(h) Block layer



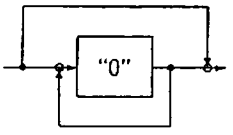
ESC: extension_start_code
ED: extension_data

(i) Extension (EXT) definition



UDSC: user_data_start_code
UD: user_data

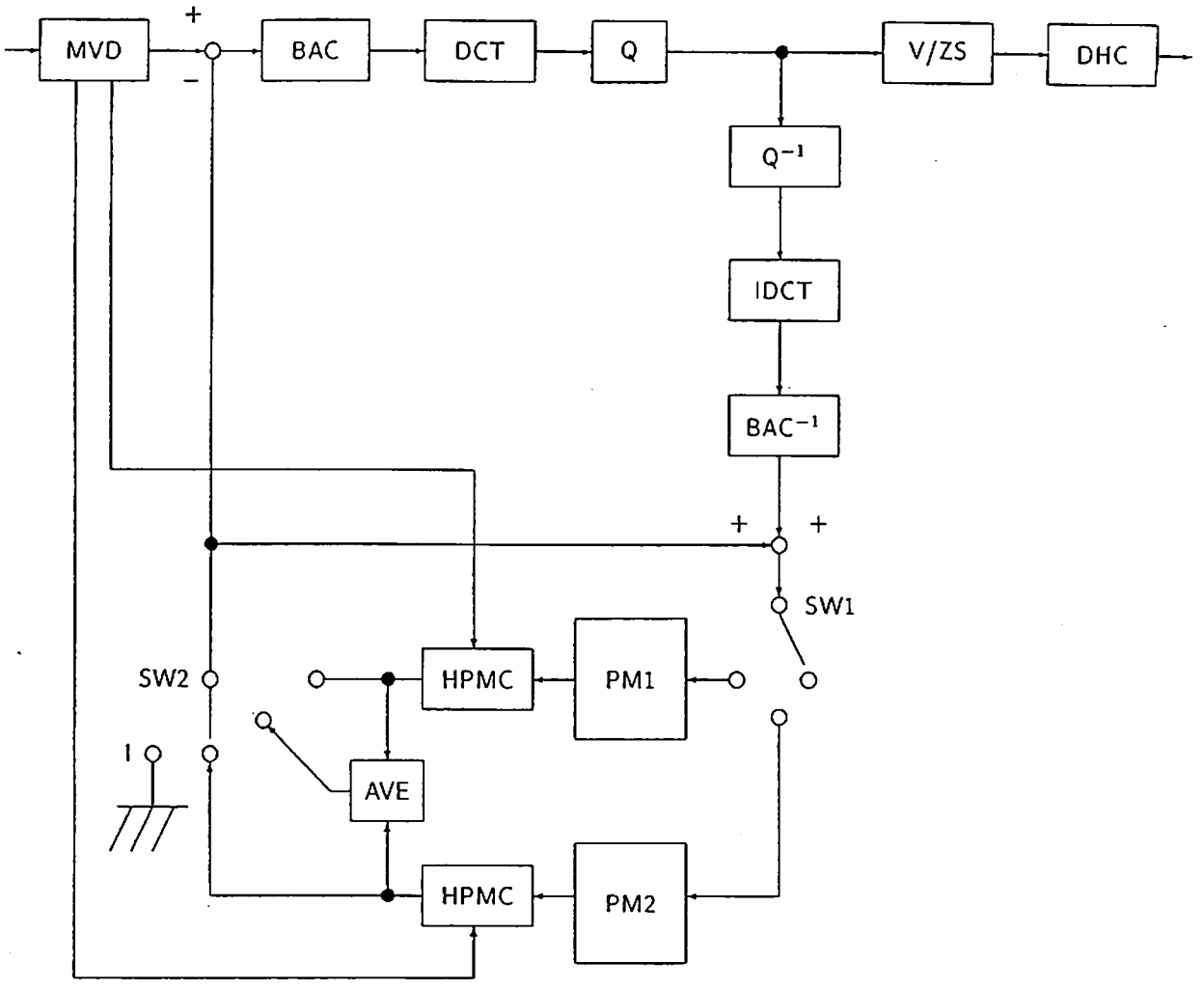
(j) User (USR) definition



(k) Stuffing (STF) definition

Fig. 9. Syntax diagram.

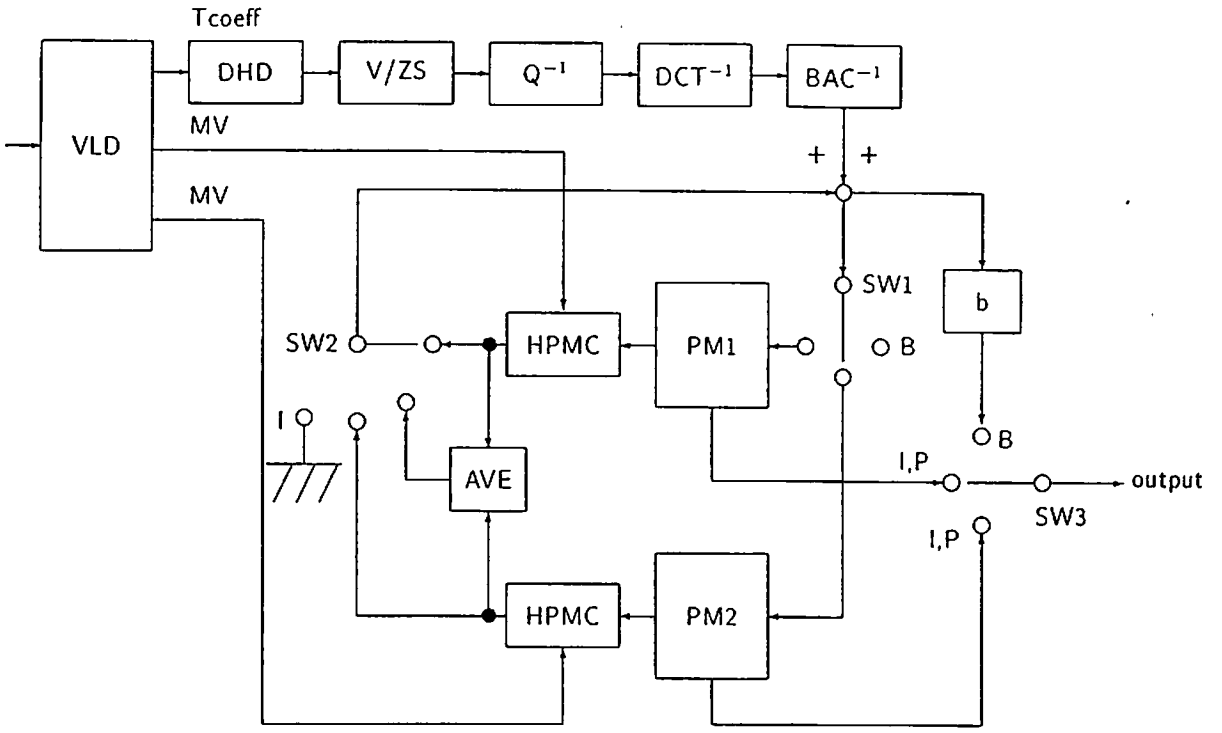
11 Encoder Block diagram



MVD: Motion Vector Detection (including two picture buffers)
BAC, BAC^{-1}: Block Arrangement Changer and its inverse (frame/field coding) (New)
Macroblock (16x16) is devided into blocks (8x8) by two methods.
DCT, IDCT: Discrete Cosine Transform and its inverse (8x8)
Q, Q^{-1}: Quantizer and Dequantizer
V/ZS: Vertical/Zigzag scanner (New)
Vertical or normal zigzag scanning order can be selected.
DHC: Dynamic Huffman Coder (New)
Run-level VLC is modified to dynamic Huffman coding.
PM1, PM2: Picture Memory 1 and 2 (704 x 480 x 8 bits)
HPMC: Half-Pel Motion Compensation (1, 1 /2 or -1, 5, 5, -1 /8) (New)
Half pel MC is modified to be selected two methods by the situation.
AVE: Averaging for interpolative prediction
SW1: Switch 1 selects 'B' in B-picture. Other two terminals are connected alternately in I- and P-pictures.
SW2: Switch 2 selects 4 predictions in B-picture, selects 'I' in the former process in I-picture, selects the other side of PM's in former process in P-picture, and selects self reconstruction picture side in delayed process in I- and P-picture. (New)

Fig. 10. Encoder diagram.

12 Decoder Block diagram



VLD: Variable length code decoder
DHD: Dynamic Huffman decoder
SW3: SW3 outputs the current reconstructed image when processing B-picture, and outputs the other side of the PM which is fed into the current reconstructed image when processing I- or P-picture. (When SW3 is connected to PM2, SW3 outputs from PM1)
b: Scanning line transform

Fig. 11. Decoder diagram.

13 Compatibility

This proposed algorithm can have "superset" compatibility to MPEG1, with some modifications as follow:

(1)VLC's of macroblock types. For example, VLC's for macroblocks in I-pictures can be modified to have the order "I", "I+Q", "*", and "*+Q". For P-pictures and B-pictures these changes can be done with some degradation of coding efficiency.

(2)"Field/frame" bit in B-picture and (3) "vertical/zigzag" bit in all picture types must be included in the macroblock types. (4) CBP must be used.

(5) Dynamic Huffman coding must be modified to recognize the difference of dct_coeff_first and dct_coeff_next and must be modified to be initialized to be the same code as MPEG1(not only the same length) and dynamic code changing must be able to be stopped.

14 Random access

This coding scheme have 12 frames per GOP. The B-pictures before the first I-picture in GOP's cannot be random accessed. The maximum random access time is for the B-picture which is between the 2nd and 3rd P-pictures. The random access time is about 33 msec * 5 = 167 msec.

15 Coding/decoding delay

(1) Frame-based MPEG1 structure at M=3 causes the delay time 100 msec.

(2) Coded bit stream buffer delay are maximum 180 msec(at 4 Mb/s) and 110 msec(at 9 Mb/s) because the sum of length of encoder output buffer and decoder input buffer is about 700 kbit(4 Mb/s) and 1 M bit(9 Mb/s).

(1)+(2)= 280 msec (4 Mb/s), 210 msec (9 Mb/s)

16 Bit Streams

```
titan{katayama}186: ls -l bs*
-rw-rw-r--   1 katayama gct      2479914 Oct 15 10:33 bs4fl
-rw-rw-r--   1 katayama gct      2505894 Oct 15 08:55 bs4mb
-rw-rw-r--   1 katayama gct      2472195 Oct 15 12:10 bs4tb
-rw-rw-r--   1 katayama gct      5404084 Oct 15 03:31 bs9fl
-rw-rw-r--   1 katayama gct      5436002 Oct 15 01:36 bs9mb
-rw-rw-r--   1 katayama gct      5486935 Oct 15 07:21 bs9pp
-rw-rw-r--   1 katayama gct      5387391 Oct 15 05:26 bs9tb
```

References

[1] J.S. *Vitter: "Design and analysis of dynamic Huffman codes", Journal of the Association for Computing Machinery, Vol.34, No.4, Oct.1987, pp.825-845.*

Cumulative bit count onece every 0.4 second for each sequence

gop bits * 2.5 = "bit/s" Average SNR in GOP (Y, Cb, Cr)

Flower Garden 4 M

---

log4fl: gop bits= 1561627 bit/s= 3904067.50 SNR (12 frames) 31.23 36.15 36.36
log4fl: gop bits= 1576153 bit/s= 3940382.50 SNR (12 frames) 30.97 36.03 35.99
log4fl: gop bits= 1611306 bit/s= 4028265.00 SNR (12 frames) 31.36 36.39 36.15
log4fl: gop bits= 1599926 bit/s= 3999815.00 SNR (12 frames) 31.20 35.93 35.67
log4fl: gop bits= 1580652 bit/s= 3951630.00 SNR (12 frames) 30.26 35.56 35.44
log4fl: gop bits= 1629467 bit/s= 4073667.50 SNR (12 frames) 30.56 35.48 35.32
log4fl: gop bits= 1602642 bit/s= 4006605.00 SNR (12 frames) 30.65 35.62 35.40
log4fl: gop bits= 1573540 bit/s= 3933850.00 SNR (12 frames) 30.70 35.74 35.52
log4fl: gop bits= 1648991 bit/s= 4122477.50 SNR (12 frames) 28.46 34.73 34.74
log4fl: gop bits= 1517436 bit/s= 3793590.00 SNR (12 frames) 28.85 34.42 34.42
log4fl: gop bits= 1534737 bit/s= 3836842.50 SNR (12 frames) 29.81 34.28 34.35
log4fl: gop bits= 1506664 bit/s= 3766660.00 SNR (12 frames) 30.12 34.67 34.71
log4fl: gop bits= 896136 bit/s= 4480680.00 SNR (6 frames) 29.51 33.86 33.98
log4fl:total SNR (150 frames) 30.22 35.29 35.23
average bitrate= 3967855.4

Mobile & Calender 4 M

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log4mb: gop bits= 1605466 bit/s= 4013665.00 SNR (12 frames) 27.35 34.54 34.78
log4mb: gop bits= 1494660 bit/s= 3736650.00 SNR (12 frames) 28.81 34.63 34.92
log4mb: gop bits= 1607346 bit/s= 4018365.00 SNR (12 frames) 30.12 35.31 35.62
log4mb: gop bits= 1596124 bit/s= 3990310.00 SNR (12 frames) 29.49 35.09 35.37
log4mb: gop bits= 1607863 bit/s= 4019657.50 SNR (12 frames) 29.04 34.75 35.00
log4mb: gop bits= 1654985 bit/s= 4137462.50 SNR (12 frames) 28.87 34.53 34.74
log4mb: gop bits= 1529387 bit/s= 3823467.50 SNR (12 frames) 28.33 34.40 34.63
log4mb: gop bits= 1602840 bit/s= 4007100.00 SNR (12 frames) 28.89 34.53 34.77
log4mb: gop bits= 1566077 bit/s= 3915192.50 SNR (12 frames) 29.46 34.80 35.01
log4mb: gop bits= 1668126 bit/s= 4170315.00 SNR (12 frames) 29.81 35.00 35.15
log4mb: gop bits= 1645604 bit/s= 4114010.00 SNR (12 frames) 30.11 35.09 35.34
log4mb: gop bits= 1565941 bit/s= 3914852.50 SNR (12 frames) 30.57 35.25 35.56
log4mb: gop bits= 902695 bit/s= 4513475.00 SNR (6 frames) 29.49 34.41 34.68
log4mb:total SNR (150 frames) 29.17 34.80 35.05
average bitrate= 4009422.8

Table Tennis 4 M

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log4tb: gop bits= 1737804 bit/s= 4344510.00 SNR (12 frames) 28.65 39.99 40.59
log4tb: gop bits= 1528127 bit/s= 3820317.50 SNR (12 frames) 27.46 39.78 40.23
log4tb: gop bits= 1470471 bit/s= 3676177.50 SNR (12 frames) 29.09 40.41 41.12
log4tb: gop bits= 1456646 bit/s= 3641615.00 SNR (12 frames) 33.33 41.89 42.40
log4tb: gop bits= 1573404 bit/s= 3933510.00 SNR (12 frames) 34.43 41.54 41.86
log4tb: gop bits= 1567901 bit/s= 3919752.50 SNR (12 frames) 33.75 41.18 41.39
log4tb: gop bits= 1585524 bit/s= 3963810.00 SNR (12 frames) 34.63 41.26 41.36
log4tb: gop bits= 1590372 bit/s= 3975930.00 SNR (12 frames) 35.34 41.82 42.17
log4tb: gop bits= 1736879 bit/s= 4342197.50 SNR (12 frames) 33.96 41.26 41.40
log4tb: gop bits= 1513906 bit/s= 3784765.00 SNR (12 frames) 33.71 41.19 41.41
log4tb: gop bits= 1676258 bit/s= 4190645.00 SNR (12 frames) 32.90 41.19 41.36
log4tb: gop bits= 1565742 bit/s= 3914355.00 SNR (12 frames) 33.26 41.33 41.71
log4tb: gop bits= 774488 bit/s= 3872440.00 SNR (6 frames) 32.27 40.67 40.88
log4tb:total SNR (150 frames) 31.73 41.01 41.36
average bitrate= 3955504.4

Flower Garden 9 M

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log9fl: gop bits= 3470395 bit/s= 8675987.50 SNR (12 frames) 35.57 39.54 39.19
log9fl: gop bits= 3542557 bit/s= 8856392.50 SNR (12 frames) 35.59 39.76 39.18
log9fl: gop bits= 3430965 bit/s= 8577412.50 SNR (12 frames) 35.69 39.71 39.07
log9fl: gop bits= 3440671 bit/s= 8601677.50 SNR (12 frames) 35.45 39.43 38.66
log9fl: gop bits= 3523886 bit/s= 8809715.00 SNR (12 frames) 34.71 38.82 38.20
log9fl: gop bits= 3475417 bit/s= 8688542.50 SNR (12 frames) 34.81 38.77 38.11
log9fl: gop bits= 3482581 bit/s= 8706452.50 SNR (12 frames) 34.84 38.90 38.27
log9fl: gop bits= 3445236 bit/s= 8613090.00 SNR (12 frames) 35.15 39.12 38.47
log9fl: gop bits= 3704238 bit/s= 9260595.00 SNR (12 frames) 33.13 37.51 37.13
log9fl: gop bits= 3415099 bit/s= 8537747.50 SNR (12 frames) 33.29 37.19 36.67
log9fl: gop bits= 3200460 bit/s= 8001150.00 SNR (12 frames) 33.71 37.09 36.53
log9fl: gop bits= 3165387 bit/s= 7913467.50 SNR (12 frames) 34.20 37.61 37.20
log9fl: gop bits= 1935748 bit/s= 9678740.00 SNR (6 frames) 33.94 37.62 37.21
log9fl:total SNR (150 frames) 34.56 38.47 37.93
average bitrate= 8646528.0

Mobile & Calender 9 M

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log9mb: gop bits= 3481677 bit/s= 8704192.50 SNR (12 frames) 31.17 36.75 37.21
log9mb: gop bits= 3260639 bit/s= 8151597.50 SNR (12 frames) 33.00 37.14 37.61
log9mb: gop bits= 3247700 bit/s= 8119250.00 SNR (12 frames) 33.74 37.97 38.39
log9mb: gop bits= 3478248 bit/s= 8695620.00 SNR (12 frames) 33.56 37.80 38.19
log9mb: gop bits= 3526153 bit/s= 8815382.50 SNR (12 frames) 33.23 37.37 37.77
log9mb: gop bits= 3740234 bit/s= 9350585.00 SNR (12 frames) 32.98 37.05 37.44
log9mb: gop bits= 3491477 bit/s= 8728692.50 SNR (12 frames) 32.59 37.00 37.37
log9mb: gop bits= 3550983 bit/s= 8877457.50 SNR (12 frames) 33.08 37.11 37.50
log9mb: gop bits= 3184762 bit/s= 7961905.00 SNR (12 frames) 33.34 37.50 37.82
log9mb: gop bits= 3585148 bit/s= 8962870.00 SNR (12 frames) 34.02 38.04 38.37
log9mb: gop bits= 3468529 bit/s= 8671322.50 SNR (12 frames) 34.38 38.33 38.77
log9mb: gop bits= 3207523 bit/s= 8018807.50 SNR (12 frames) 34.43 38.29 38.82
log9mb: gop bits= 2264907 bit/s= 11324535.00 SNR (6 frames) 34.49 38.38 38.81
log9mb:total SNR (150 frames) 33.25 37.53 37.94
average bitrate= 8697596.0

Popple 9 M

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log9pp: gop bits= 2876372 bit/s= 7190930.00 SNR (12 frames) 35.20 41.01 41.20
log9pp: gop bits= 3369132 bit/s= 8422830.00 SNR (12 frames) 36.06 41.80 41.90
log9pp: gop bits= 3325686 bit/s= 8314215.00 SNR (12 frames) 36.15 42.10 42.17
log9pp: gop bits= 3288199 bit/s= 8220497.50 SNR (12 frames) 36.11 41.91 42.14
log9pp: gop bits= 3377879 bit/s= 8444697.50 SNR (12 frames) 36.13 41.90 42.03
log9pp: gop bits= 3603742 bit/s= 9009355.00 SNR (12 frames) 36.22 41.89 42.09
log9pp: gop bits= 3519210 bit/s= 8798025.00 SNR (12 frames) 36.67 42.80 42.81
log9pp: gop bits= 3814851 bit/s= 9537127.50 SNR (12 frames) 36.72 42.86 42.90
log9pp: gop bits= 3848036 bit/s= 9620090.00 SNR (12 frames) 34.19 39.81 40.14
log9pp: gop bits= 3566238 bit/s= 8915595.00 SNR (12 frames) 33.48 38.60 39.14
log9pp: gop bits= 3698228 bit/s= 9245570.00 SNR (12 frames) 32.72 38.14 38.56
log9pp: gop bits= 3702203 bit/s= 9255507.50 SNR (12 frames) 32.20 37.74 38.09
log9pp: gop bits= 1905666 bit/s= 9528330.00 SNR (6 frames) 31.90 37.38 37.82
log9pp:total SNR (150 frames) 34.70 40.32 40.61
average bitrate= 8779088.4

Table Tennis 9 M

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log9tb: gop bits= 3671530 bit/s= 9178825.00 SNR (12 frames) 32.11 41.17 42.27
log9tb: gop bits= 3518435 bit/s= 8796087.50 SNR (12 frames) 31.05 41.22 42.13
log9tb: gop bits= 3242874 bit/s= 8107185.00 SNR (12 frames) 32.38 41.65 42.77
log9tb: gop bits= 2994926 bit/s= 7487315.00 SNR (12 frames) 35.75 43.37 44.32
log9tb: gop bits= 3166566 bit/s= 7916415.00 SNR (12 frames) 36.84 43.60 44.30
log9tb: gop bits= 3094879 bit/s= 7737197.50 SNR (12 frames) 36.28 43.12 43.80
log9tb: gop bits= 3433077 bit/s= 8582692.50 SNR (12 frames) 37.55 43.66 44.38
log9tb: gop bits= 3535207 bit/s= 8838017.50 SNR (12 frames) 38.06 44.57 45.53
log9tb: gop bits= 3768574 bit/s= 9421435.00 SNR (12 frames) 37.06 43.90 44.79
log9tb: gop bits= 3361496 bit/s= 8403740.00 SNR (12 frames) 37.07 44.05 44.97
log9tb: gop bits= 3847261 bit/s= 9618152.50 SNR (12 frames) 36.45 43.91 44.70
log9tb: gop bits= 3577808 bit/s= 8944520.00 SNR (12 frames) 36.60 44.10 44.99
log9tb: gop bits= 1886462 bit/s= 9432310.00 SNR (6 frames) 35.51 43.81 44.59
log9tb:total SNR (150 frames) 34.95 43.07 43.96
average bitrate= 8619819.0

Institute: GC Technology Corp. Frames: 0 - 149 Date: 15 Oct. 1991

Item				Sequence :flower All	Intra	Predic.	Interp.	Sequence :mobile All	Intra	Predic.	Interp.	Sequence :table All	Intra	Predic.	Interp.
1. RMS for luminance				13.81	13.09	13.34	14.06	8.88	8.51	7.39	9.41	6.60	5.35	5.51	7.10
2. SNR for luminance				25.33	25.79	25.63	25.17	29.17	29.53	30.76	28.66	31.73	33.57	33.31	31.10
SNR for chrominance(Cb)				34.64	35.75	34.32	34.64	34.80	34.96	34.85	34.76	41.01	41.53	40.99	40.95
SNR for chrominance(Cr)				35.01	35.95	34.64	35.04	35.05	35.36	35.20	34.95	41.36	42.12	41.51	41.21
3. Mean value of stepsize				20.39	11.82	11.82	24.67	24.48	17.94	13.42	29.43	16.70	10.67	9.43	20.18
4. M.v.of # of nonzero coef				4.51	11.90	5.59	1.01	5.30	13.55	5.15	1.40	4.39	11.26	5.01	1.30
5. M.v.of # of zero coeffic				7.76	11.25	11.89	2.84	11.73	14.54	15.89	4.57	11.74	15.91	16.65	5.35
6. Macro Intra Pred. Interp															
block *	fixed	skpd		---	672	0	314	---	678	0	582	---	989	0	440
type *+Q	I	ItrpNC		---	423	11	347	---	453	6	256	---	97	19	288
I *		ItrpCd		---	185	37	85	---	140	17	63	---	211	66	203
I+Q	P	FrwdNC		---	38	486	99	---	47	789	79	---	20	914	70
-----	t	FrwdCd		---	0	274	58	---	0	168	37	---	0	181	78
-----	p	BkwdNC		---	0	510	59	---	0	338	56	---	0	137	44
-----	+Q	BkwdCd		---	0	393	46	---	0	368	36	---	0	91	74
-----	-----	Intra		---	0	0	0	---	0	0	0	---	0	0	4
-----	-----	Itrp+Q		---	0	0	133	---	0	0	95	---	0	0	58
-----	-----	Frwd+Q		---	0	0	80	---	0	0	52	---	0	0	23
-----	-----	Bkwd+Q		---	0	0	93	---	0	0	56	---	0	0	30
-----	-----	Intr+Q		---	0	0	1	---	0	0	1	---	0	0	1
7. The number of coded MB's				747	1320	1215	499	659	1320	1281	343	748	1320	1283	476
The number of coded Blk's				4482	7920	7295	2995	3958	7920	7689	2062	4491	7920	7700	2858
8. Number MacroBlock Addr.				1370	1320	1320	1395	1285	1320	1320	1268	1300	1320	1320	1290
of MacroBlock Type				4879	3550	6427	4479	4163	3517	7004	3196	4450	3223	7408	3515
bits MacroBlock Quant				1712	2310	1965	1541	1358	2506	1840	1031	547	591	459	573
MotionVector Data				9889	4861	13049	9374	6282	5253	8266	5681	8529	5221	9659	8541
CBP				0	0	0	0	0	0	0	0	0	0	0	0
EOB				9700	27160	18646	4121	9735	29165	19776	3494	10070	27534	19503	4310
Differential DC				3374	33471	1686	87	3494	37203	889	75	2869	24925	2160	263
Coefficient Total				99500	422711	208641	17100	105515	476014	214565	17002	102289	403463	212003	22542
Y				86424	347744	182591	16871	91939	388004	191984	16434	96376	371164	201712	21679
Cb				7467	40506	15603	162	6470	43705	10402	175	2397	14828	3920	217
Cr				5608	34460	10447	67	7105	44305	12179	392	3515	17470	6370	645
Extra data				1831	3745	2552	1317	1810	3738	2470	1315	1791	3743	2389	1317
Total				132261	499131	254290	39418	133647	558719	256135	33067	131850	470024	254904	42357

Fig. 12 Statistics of the proposal algorithm simulation (4 Mb/s)

Institute: GC Technology Corp. Frames : 0 - 149 Date: 15 Oct. 1991

Sequence :flower All	Intra	Predic.	Interp.	Sequence :mobile All	Intra	Predic.	Interp.	Sequence :table All	Intra	Predic.	Interp.	Sequence :popple All	Intra	Predic.	Interp.
11.43	11.02	10.97	11.65	5.55	4.67	4.70	5.93	4.56	3.18	3.48	5.04	4.69	3.15	3.78	5.15
26.97	27.29	27.33	26.81	33.25	34.74	34.69	32.68	34.95	38.08	37.30	34.08	34.70	38.16	36.58	33.90
37.19	38.17	37.29	37.05	37.53	38.49	37.68	37.37	43.07	44.26	43.16	42.90	40.32	44.14	41.91	39.57
37.51	38.52	37.45	37.41	37.94	38.96	38.14	37.75	43.96	45.22	44.17	43.75	40.61	44.17	42.07	39.90
9.31	7.72	6.71	10.48	10.46	8.52	7.59	11.77	7.94	5.69	5.52	9.12	9.43	6.15	6.59	10.92
6.94	17.78	11.46	3.18	7.07	22.58	9.78	3.24	6.61	20.03	10.70	2.64	6.25	13.59	8.08	4.18
10.76	14.27	16.51	7.62	14.32	17.86	20.98	10.62	17.26	21.37	23.01	14.01	13.96	25.08	19.08	9.71
---	912	0	60	---	949	0	160	---	1078	0	115	---	655	0	6
---	183	11	134	---	182	6	89	---	9	19	90	---	16	10	206
---	211	37	389	---	167	17	411	---	230	64	610	---	645	56	551
---	13	531	37	---	20	889	20	---	1	939	22	---	3	836	46
---	0	223	205	---	0	138	198	---	0	165	196	---	0	298	150
---	0	516	16	---	0	268	12	---	0	132	11	---	0	118	23
---	0	132	181	---	0	154	157	---	0	10	192	---	0	25	137
---	0	0	1	---	0	0	1	---	0	0	5	---	0	0	22
---	0	0	145	---	0	0	142	---	0	0	39	---	0	0	94
---	0	0	67	---	0	0	53	---	0	0	14	---	0	0	34
---	0	0	78	---	0	0	73	---	0	0	19	---	0	0	40
---	0	0	0	---	0	0	0	---	0	0	0	---	0	0	6
1147	1320	1296	1069	1129	1320	1308	1037	1158	1320	1316	1079	1130	1320	1315	1037
6885	7920	7779	6419	6774	7920	7849	6227	6953	7920	7901	6477	6782	7920	7891	6225
1343	1320	1320	1354	1359	1320	1320	1378	1339	1320	1320	1349	1322	1320	1320	1323
6135	3285	6627	6323	5990	3219	7227	5892	5764	3115	7503	5465	6094	3956	7385	5894
1220	984	662	1458	1176	1016	771	1346	261	53	50	366	624	97	125	878
10361	4861	12947	10119	6992	5253	7885	6887	9209	5221	9613	9579	24288	5601	21418	27779
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18894	31601	27346	14116	18939	34389	26323	14199	18406	33653	27373	13106	18838	29575	24772	15247
3368	33471	1675	81	3485	37203	872	68	2842	24925	2088	249	4395	34116	2430	1258
245061	680247	458291	109592	250174	853879	402925	115174	247713	771758	445890	106261	235244	550053	360104	148120
211162	540060	381824	105260	218043	677642	352031	108719	231269	679194	420201	103133	186066	439839	290574	114407
17695	70652	40097	2521	15795	89787	24922	2798	7897	48694	12096	1040	26105	58112	36988	17917
16204	69534	36369	1810	16336	86450	25972	3655	8546	43869	13593	2087	23072	52102	32541	15795
1830	3737	2544	1319	1801	3734	2428	1318	1790	3746	2384	1316	1826	3741	2533	1317
288217	759509	511416	144366	289919	940016	449754	146268	287327	843793	496225	137694	292636	628462	420090	201820

Fig. 13 Statistics of the proposal algorithm simulation (9 Mb/s)

MPEG2 GCE model MBQ Zig/Vert 3980000 bit/sec
Sequence:/usr3/fl/flower 0 to 149

Mode	fr#	sq	bits	mq	SNR Y	Cb	Cr
I :	2	14	:441603	14	33.29	37.45	37.43
B:	0	32	: 55881	34	28.96	35.75	36.55
B:	1	32	: 33719	34	30.22	36.23	36.72
P :	5	14	:233286	14	32.31	35.81	36.11
B:	3	30	: 32655	33	30.99	37.05	37.21
B:	4	26	: 34849	28	31.49	36.98	37.12
P :	8	12	:271227	13	32.87	35.96	36.02
B:	6	24	: 42976	26	31.15	35.91	36.16
B:	7	24	: 41445	26	31.08	35.89	36.07
P :	11	12	:286153	13	32.70	35.77	35.59
B:	9	24	: 42895	26	30.90	35.39	35.73
B:	10	24	: 44938	26	30.72	36.07	36.03
gop	1561627	(12	frames)		31.23	36.15	36.36
I :	14	14	:464390	14	33.03	37.28	36.98
B:	12	26	: 69399	28	29.02	34.98	35.42
B:	13	30	: 30379	33	30.02	36.21	36.42
P :	17	12	:265080	13	32.85	36.07	35.98
B:	15	30	: 31282	33	30.34	36.61	36.63
B:	16	28	: 31051	30	31.17	36.96	36.77
P :	20	12	:264562	13	32.62	35.72	35.54
B:	18	26	: 59320	27	29.44	35.73	35.87
B:	19	28	: 30396	30	30.43	35.51	35.68
P :	23	12	:263379	13	32.71	35.93	35.65
B:	21	26	: 33037	28	31.02	35.82	35.58
B:	22	24	: 33878	25	31.38	35.98	35.72
gop	1576153	(12	frames)		30.97	36.03	35.99
I :	26	14	:469143	14	32.91	37.30	36.89
B:	24	22	: 62109	23	30.20	35.83	35.82
B:	25	24	: 47275	26	30.04	36.15	36.10
P :	29	12	:263318	13	32.83	36.22	35.85
B:	27	24	: 39962	26	31.10	37.32	36.95
B:	28	24	: 38273	26	30.95	36.78	36.63
P :	32	12	:234637	13	32.85	36.40	35.99
B:	30	24	: 34433	24	31.88	36.74	36.27
B:	31	22	: 39112	23	31.59	36.64	36.37
P :	35	12	:252142	13	32.69	35.86	35.46
B:	33	20	: 85084	21	30.46	36.17	36.00
B:	34	24	: 45818	26	30.34	35.67	35.71
gop	1611306	(12	frames)		31.36	36.39	36.15
I :	38	14	:474361	14	32.68	37.07	36.56
B:	36	24	: 34465	26	30.65	35.40	35.29
B:	37	22	: 41502	23	30.56	36.28	36.21
P :	41	12	:246443	13	32.66	35.96	35.67
B:	39	22	: 52340	24	30.40	36.77	36.54
B:	40	22	: 48191	24	30.59	36.51	36.38
P :	44	12	:269383	13	32.36	35.37	35.10
B:	42	22	: 43154	24	30.61	35.36	35.35
B:	43	22	: 46362	24	30.69	36.09	35.73
P :	47	12	:265090	13	32.43	35.39	35.11
B:	45	22	: 39384	23	31.04	35.74	35.32
B:	46	22	: 39251	24	30.83	35.63	35.22
gop	1599926	(12	frames)		31.20	35.93	35.67
I :	50	14	:488671	14	32.47	36.83	36.32
B:	48	22	: 66458	24	29.65	34.40	34.64
B:	49	26	: 47024	29	29.14	35.82	35.79
P :	53	12	:245515	13	32.48	35.61	35.53
B:	51	28	: 30697	32	29.60	36.16	36.10
B:	52	26	: 59254	28	28.92	36.14	36.28
P :	56	12	:276979	13	32.27	35.32	35.07
B:	54	28	: 35128	30	29.73	35.95	35.70
B:	55	28	: 31878	31	29.58	35.64	35.38
P :	59	14	:236058	14	31.56	34.62	34.58
B:	57	28	: 29260	32	30.05	35.50	35.24
B:	58	26	: 33730	30	29.79	35.32	35.08
gop	1580652	(12	frames)		30.26	35.56	35.44
I :	62	14	:499592	15	32.36	36.72	36.36
B:	60	24	: 52100	26	29.33	33.97	34.26
B:	61	24	: 78569	27	28.77	35.20	35.45
P :	65	12	:269398	13	32.30	35.48	35.21
B:	63	28	: 33806	32	29.74	36.76	36.43
B:	64	28	: 32792	32	29.89	36.66	36.29
P :	68	14	:210795	15	31.40	35.00	34.89
B:	66	28	: 23697	29	31.19	35.41	35.17
B:	67	24	: 27300	25	30.77	35.25	35.05
P :	71	12	:304339	13	32.05	35.09	34.77
B:	69	20	: 56712	22	30.69	35.77	35.42
B:	70	24	: 40367	27	30.03	35.31	35.11
gop	1629467	(12	frames)		30.56	35.48	35.32
I :	74	12	:573210	13	32.98	37.25	36.82
B:	72	26	: 28226	29	29.86	34.71	34.53
B:	73	28	: 31854	32	28.96	35.41	35.44
P :	77	12	:276075	13	32.26	35.64	35.42
B:	75	30	: 25934	35	29.98	36.41	36.29
B:	76	30	: 22343	34	30.00	35.89	35.75
P :	80	12	:280527	13	32.25	35.28	34.95
B:	78	30	: 25744	32	30.48	35.77	35.44
B:	79	30	: 24045	34	29.96	35.34	35.13
P :	83	12	:268578	13	32.10	35.28	34.99
B:	81	30	: 23175	33	30.41	35.43	35.14
B:	82	30	: 22931	34	30.45	35.58	35.31
gop	1602642	(12	frames)		30.65	35.62	35.40

MPEG2 GCE model MBQ Zig/Vert 3980000 bit/sec
Sequence:/usr2/mc/mobile 0 to 149

Mode	fr#	sq	bits	mq	SNR Y	Cb	Cr
I :	2	14	:611815	15	30.31	35.76	36.24
B:	0	32	: 66028	37	25.46	34.04	34.13
B:	1	38	: 27454	44	25.77	34.48	34.72
P :	5	14	:248244	15	29.60	34.74	35.11
B:	3	38	: 24994	43	26.76	35.18	35.49
B:	4	38	: 23862	43	26.66	34.98	35.19
P :	8	14	:258328	15	29.57	34.25	34.53
B:	6	36	: 26005	42	26.90	34.42	34.64
B:	7	36	: 26317	42	26.65	34.35	34.52
P :	11	14	:238796	15	29.69	34.13	34.39
B:	9	36	: 26015	42	27.16	34.22	34.38
B:	10	34	: 27608	38	27.04	34.23	34.44
gop	1605466	(12	frames)		27.35	34.54	34.78
I :	14	16	:541207	18	29.36	35.04	35.46
B:	12	34	: 28681	37	26.84	33.80	33.84
B:	13	32	: 28822	36	26.89	33.90	34.18
P :	17	14	:214236	15	29.65	34.58	34.99
B:	15	30	: 25519	32	28.05	34.85	35.14
B:	16	26	: 30131	27	28.27	34.95	35.24
P :	20	12	:254698	13	30.62	34.65	35.03
B:	18	24	: 30663	26	29.20	34.80	35.08
B:	19	24	: 30751	26	29.16	35.07	35.32
P :	23	12	:246547	13	30.77	34.44	34.79
B:	21	24	: 29769	26	29.48	34.71	34.96
B:	22	22	: 33636	23	29.49	35.08	35.34
gop	1494660	(12	frames)		28.81	34.63	34.92
I :	26	14	:616757	15	30.34	35.71	36.19
B:	24	22	: 35983	24	29.20	34.22	34.44
B:	25	22	: 31597	24	29.37	35.00	35.15
P :	29	12	:212339	13	30.86	35.25	35.63
B:	27	22	: 24765	23	30.22	35.44	35.80
B:	28	20	: 30101	22	30.07	35.70	36.01
P :	32	12	:193140	13	30.92	35.09	35.44
B:	30	18	: 53118	20	29.70	35.42	35.67
B:	31	18	: 45077	20	30.08	35.48	35.82
P :	35	10	:284620	11	31.88	35.52	35.90
B:	33	18	: 49364	20	29.96	35.63	35.89
B:	34	22	: 30485	25	29.55	35.54	35.81
gop	1607346	(12	frames)		30.12	35.31	35.62
I :	38	14	:616304	15	30.33	35.67	36.09
B:	36	24	: 34150	27	28.93	34.97	35.14
B:	37	26	: 32967	30	28.21	34.82	35.08
P :	41	12	:246717	13	30.63	35.16	35.54
B:	39	28	: 24297	31	29.12	35.43	35.69
B:	40	28	: 24665	30	28.93	35.36	35.56
P :	44	12	:258444	13	30.74	34.92	35.29
B:	42	28	: 25458	32	29.26	34.88	35.11
B:	43	28	: 23787	30	29.19	35.26	35.44
P :	47	12	:261360	13	30.71	34.73	35.06
B:	45	28	: 23745	31	29.33	34.84	35.16
B:	46	28	: 24230	31	29.33	35.17	35.41
gop	1596124	(12	frames)		29.49	35.09	35.37
I :	50	16	:546516	18	29.40	34.95	35.37
B:	48	28	: 23965	31	28.58	34.17	34.28
B:	49	26	: 34345	28	28.07	34.74	34.89
P :	53	12	:263366	13	30.50	34.83	35.23
B:	51	26	: 35288	27	28.61	34.98	35.24
B:	52	26	: 36266	27	28.59	35.17	35.40
P :	56	12	:262132	13	30.57	34.61	34.98
B:	54	26	: 39061	28	28.45	34.81	35.03
B:	55	26	: 35485	28	28.57	34.92	35.11
P :	59	12	:265569	13	30.56	34.46	34.84
B:	57	26	: 34266	29	28.84	34.77	34.94
B:	58	26	: 31604	28	28.75	34.65	34.82
gop	1607863	(12	frames)		29.04	34.75	35.00
I :	62	16	:553487	18	29.28	34.81	35.18
B:	60	26	: 36291	29	27.96	33.81	33.93
B:	61	26	: 36134	30	27.83	34.08	34.05
P :	65	12	:291124	13	30.31	34.55	34.92
B:	63	26	: 29767	29	28.81	35.00	35.17
B:	64	28	: 24217	31	28.76	34.85	35.03
P :	68	12	:283679	13	30.47	34.46	34.78
B:	66	28	: 28222	32	28.50	34.80	34.97
B:	67	28	: 28689	32	28.34	34.71	34.88
P :	71	12	:283653	13	30.54	34.32	34.69
B:	69	28	: 29947	31	28.43	34.63	34.78
B:	70	28	: 29775	31	28.32	34.50	34.67
gop	1654985	(12	frames)		28.87	34.53	34.74
I :	74	16	:556418	18	29.29	34.76	35.17
B:	72	28	: 36395	31	27.52	33.51	33.72
B:	73	30	: 35013	34	26.82	33.86	34.09
P :	77	12	:308558	13	30.31	34.55	34.89
B:	75	32	: 31433	37	27.52	34.89	35.03
B:	76	34	: 24057	38	27.41	34.60	34.64
P :	80	14	:186967	15	30.04	34.28	34.55
B:	78	36	: 22231	40	27.51	34.53	34.73
B:	79	30	: 27474	33	28.00	34.34	34.50
P :	83	12	:230473	13	30.79	34.53	34.88
B:	81	26	: 37288	30	28.24	34.58	34.87
B:	82	26	: 33080	29	28.60	34.54	34.73
gop	1529387	(12	frames)		28.33	34.40	34.63

Mode	fr#	sq	bits	mq	SNR Y	Cb	Cr
I :	86	14	:505102	15	32.33	36.66	36.26
B:	84	30	: 39406	34	28.49	34.49	34.65
B:	85	30	: 30254	35	28.94	35.83	35.79
P :	89	12	:259536	13	32.20	35.99	35.79
B:	87	30	: 24232	31	31.17	36.58	36.21
B:	88	28	: 25338	29	31.08	36.44	36.21
P :	92	12	:304457	13	32.03	35.29	34.97
B:	90	26	: 30975	30	30.77	36.17	35.77
B:	91	28	: 26736	31	30.47	35.65	35.54
P :	95	12	:275056	13	32.04	35.31	34.98
B:	93	28	: 26756	29	30.66	35.54	35.19
B:	94	28	: 25692	32	30.24	35.41	35.20
gop	1573540	(12	frames)		30.70	35.74	35.52
I :	98	14	:508097	15	32.34	36.77	36.42
B:	96	28	: 50720	32	28.51	34.27	34.52
B:	97	30	: 64847	34	27.41	35.03	35.46
P :	101	12	:291057	13	32.09	35.30	35.02
B:	99	34	: 38381	40	27.92	35.96	35.95
B:	100	36	: 32519	41	27.91	35.83	35.73
P :	104	14	:255623	15	30.91	34.05	33.87
B:	102	38	: 35517	45	27.51	34.97	34.91
B:	103	38	: 28512	46	27.62	34.36	34.38
P :	107	14	:261305	15	30.90	33.92	33.81
B:	105	36	: 48866	43	26.35	33.81	33.85
B:	106	38	: 33547	45	26.96	33.71	33.97
gop	1648991	(12	frames)		28.46	34.73	34.74
I :	110	14	:523340	15	31.99	36.22	35.82
B:	108	38	: 34931	45	26.74	33.28	33.56
B:	109	38	: 33459	44	26.79	34.78	34.99
P :	113	14	:236484	15	30.93	34.14	34.13
B:	111	38	: 25180	44	28.01	35.31	35.41
B:	112	34	: 38242	40	27.34	35.39	35.27
P :	116	14	:261153	15	30.82	33.79	33.76
B:	114	32	: 25882	36	28.56	33.92	34.13
B:	115	30	: 31749	36	28.68	34.60	34.41
P :	119	14	:258187	15	30.80	33.85	33.82
B:	117	30	: 24329	33	29.95	34.38	34.22
B:	118	28	: 24500	32	29.40	34.15	34.11
gop	1517436	(12	frames)		28.85	34.42	34.42
I :	122	14	:519277	15	32.06	36.40	36.09
B:	120	26	: 31804	30	28.99	33.67	33.84
B:	121	26	: 58417	29	28.25	34.11	34.54
P :	125	14	:244194	15	30.97	34.55	34.56
B:	123	28	: 26972	32	30.14	35.98	35.72
B:	124	26	: 27184	30	29.41	34.81	34.95
P :	128	16	:204735	17	29.86	33.21	33.43
B:	126	24	: 35150	27	29.23	33.94	34.25
B:	127	22	: 55105	25	29.22	34.19	34.21
P :	131	14	:271446	15	30.46	33.51	33.57
B:	129	22	: 29807	24	30.30	34.10	33.96
B:	130	22	: 30646	24	30.06	33.96	33.86
gop	1534737	(12	frames)		29.81	34.28	34.35
I :	134	14	:535438	15	31.68	35.83	35.51
B:	132	22	: 47049	25	28.92	33.38	33.64
B:	133	24	: 43476	28	28.69	34.21	34.38
P :	137	16	:149117	18	30.19	34.77	34.91
B:	135	26	: 26472	30	29.62	35.51	35.32
B:	136	20	: 44408	22	29.98	35.30	35.20
P :	140	14	:243743	15	30.65	34.36	34.51
B:	138	16	: 76828	18	30.61	35.02	35.06
B:	139	18	: 51878	20	30.17	34.72	34.79
P :	143	14	:214900	15	30.63	34.13	34.23
B:	141	20	: 29436	22	30.68	34.68	34.57
B:	142	18	: 43919	20	30.46	34.72	34.71
gop	1506664	(12	frames)		30.12	34.67	34.71
I :	146	16	:486486	18	30.52	34.67	34.45
B:	144	20	: 50893	22	29.29	33.53	33.82
B:	145	20	: 81622	22	28.88	33.87	34.01
P :	149	16	:194787	18	29.51	32.89	33.33
B:	147	22	: 34639	25	29.67	34.39	34.32
B:	148	20	: 47709	23	29.34	34.03	34.06
gop	896136	(6	frames)		29.51	33.86	33.98

total SNR (150 frames) 30.22 35.29 35.23
average bits/frame= 132261.846667
average bitrate= 3967855.400000 (30 Hz)
run-level 2 d vlc codedbit: 0.323158 bit/pe
additional bits: 0.068243 bit/pe
mv bits: 0.029267 bit/pe
mode bits: 0.014441 bit/pe

MPEG2 GCE model MBQ Zig/Vert 3980000 bit/sec
Sequence:/usr4/tb/table 0 to 149

Mode:fr#	sq	bits	sqnt	SNR Y	Cb	Cr
I : 2	14	:672042	12	31.73	40.91	41.95
B: 0	32	: 29507	32	28.01	40.14	40.56
B: 1	34	: 18183	34	28.55	40.22	40.78
P : 5	14	:329895	12	30.70	40.00	41.10
B: 3	34	: 15921	34	28.89	40.72	40.99
B: 4	38	: 16182	38	28.20	40.42	40.86
P : 8	16	:277839	14	29.77	39.88	40.64
B: 6	42	: 12924	43	28.36	39.77	40.08
B: 7	42	: 11843	43	28.56	39.84	40.12
P : 11	16	:316438	14	29.56	39.31	40.46
B: 9	42	: 17481	43	27.31	39.66	39.96
B: 10	46	: 19549	48	26.60	39.30	39.97
gop 1737804 (12 frames)				28.65	39.99	40.59
I : 14	16	:594733	14	30.75	40.53	41.43
B: 12	52	: 12279	54	25.76	39.41	39.60
B: 13	54	: 11484	55	25.55	40.01	40.08
P : 17	18	:190625	16	28.94	39.68	40.48
B: 15	56	: 14422	56	26.86	39.96	40.21
B: 16	46	: 15471	47	26.72	39.78	40.08
P : 20	14	:330609	12	30.57	39.90	40.68
B: 18	38	: 19124	39	27.08	39.89	40.26
B: 19	42	: 13570	44	27.44	39.96	40.22
P : 23	16	:287049	14	29.82	39.40	40.36
B: 21	44	: 14127	46	27.42	39.60	39.97
B: 22	44	: 24634	45	26.41	39.36	39.69
gop 1528127 (12 frames)				27.46	39.78	40.23
I : 26	18	:395105	15	31.15	40.64	41.83
B: 24	46	: 34233	44	25.17	39.43	39.80
B: 25	44	: 33614	41	26.27	39.87	40.44
P : 29	16	:257264	13	31.46	40.24	41.08
B: 27	42	: 33696	38	28.00	40.23	40.98
B: 28	38	: 35769	33	28.49	40.38	41.14
P : 32	14	:283938	11	32.97	40.63	41.49
B: 30	34	: 41709	29	29.25	40.21	40.96
B: 31	34	: 33923	29	29.80	40.65	41.31
P : 35	14	:239515	11	33.29	41.01	41.64
B: 33	32	: 39770	26	30.45	40.89	41.55
B: 34	28	: 41935	23	30.92	40.98	41.63
gop 1470471 (12 frames)				29.09	40.41	41.12
I : 38	16	:280017	13	34.00	42.59	43.52
B: 36	26	: 47572	20	31.15	41.11	41.42
B: 37	22	: 58278	18	31.73	41.67	42.16
P : 41	12	:182039	11	34.09	41.85	42.56
B: 39	20	: 69475	16	32.78	42.26	42.87
B: 40	18	: 66781	15	33.18	42.27	42.97
P : 44	10	:233193	9	34.95	41.99	42.69
B: 42	16	: 91506	13	33.74	41.97	42.45
B: 43	18	: 68985	15	33.49	41.82	42.18
P : 47	10	:216786	10	35.03	41.84	42.48
B: 45	18	: 73213	15	33.72	41.78	41.94
B: 46	18	: 68801	16	33.82	41.71	41.97
gop 1456646 (12 frames)				33.33	41.89	42.40
I : 50	14	:268024	11	35.46	42.78	43.50
B: 48	16	: 93903	13	33.85	41.54	41.76
B: 49	16	: 88249	13	33.92	41.64	41.96
P : 53	10	:227580	9	35.36	41.84	42.34
B: 51	16	: 80758	13	34.27	41.73	41.95
B: 52	16	: 77852	13	34.23	41.78	41.97
P : 56	10	:220527	10	35.19	41.44	41.87
B: 54	16	: 75446	14	34.13	41.37	41.72
B: 55	16	: 70835	13	34.11	41.27	41.57
P : 59	10	:223848	10	35.02	41.18	41.54
B: 57	16	: 75118	13	34.09	41.15	41.30
B: 58	16	: 71264	14	33.97	41.07	41.25
gop 1573404 (12 frames)				34.43	41.54	41.86
I : 62	12	:273750	11	35.29	42.26	42.93
B: 60	16	: 84671	13	33.53	40.82	41.22
B: 61	16	: 69922	13	33.62	41.39	41.75
P : 65	10	:222244	10	34.96	41.31	41.74
B: 63	16	: 68017	14	34.03	41.54	42.17
B: 64	14	: 85468	11	34.37	41.65	42.12
P : 68	10	:422514	10	34.11	41.22	41.42
B: 66	14	:128665	11	33.75	40.67	40.62
B: 67	22	: 22744	21	32.52	40.85	40.71
P : 71	12	:104090	12	33.37	40.85	40.92
B: 69	24	: 23672	22	32.90	40.91	40.74
B: 70	14	: 62144	11	33.39	40.92	40.92
gop 1567901 (12 frames)				33.75	41.18	41.39
I : 74	12	:358239	12	33.19	40.84	40.79
B: 72	14	: 73054	11	33.28	40.85	40.89
B: 73	12	: 64611	12	33.32	40.89	40.95
P : 77	6	:368114	6	36.55	41.58	41.80
B: 75	10	: 62165	10	34.64	41.41	41.49
B: 76	12	: 38057	12	34.37	41.36	41.37
P : 80	8	:162002	8	35.31	41.28	41.41
B: 78	14	: 33974	11	34.66	41.29	41.37
B: 79	10	: 47630	10	34.87	41.26	41.38
P : 83	6	:276064	6	36.58	41.62	41.86
B: 81	10	: 50669	10	35.18	41.40	41.53
B: 82	10	: 50945	10	35.18	41.44	41.59
gop 1585524 (12 frames)				34.63	41.26	41.36

I : 86	16	:553063	18	29.33	34.75	35.13
B: 84	24	: 42338	27	28.12	33.95	34.08
B: 85	24	: 42198	27	28.32	33.67	33.84
P : 89	12	:257056	13	30.53	34.76	35.14
B: 87	24	: 44265	28	28.26	34.91	35.14
B: 88	26	: 33848	27	28.34	34.84	35.11
P : 92	12	:245335	14	30.70	34.61	34.96
B: 90	26	: 36734	30	28.24	34.79	34.97
B: 91	26	: 35892	30	28.52	34.65	34.86
P : 95	12	:240042	13	30.81	34.56	34.82
B: 93	26	: 40391	30	28.12	34.56	34.77
B: 94	26	: 31678	29	28.77	34.51	34.68
gop 1602840 (12 frames)				28.89	34.53	34.77
I : 98	16	:552671	18	29.29	34.75	35.08
B: 96	24	: 39291	26	28.51	34.15	34.22
B: 97	24	: 36147	27	28.36	34.44	34.57
P : 101	12	:261376	13	30.31	34.98	35.30
B: 99	24	: 33532	26	28.98	35.05	35.31
B: 100	24	: 31483	25	28.98	34.92	35.12
P : 104	12	:251387	13	30.51	34.93	35.23
B: 102	24	: 25492	26	29.76	34.88	35.05
B: 103	22	: 30046	23	29.65	34.85	35.02
P : 107	12	:217167	13	30.96	34.84	35.12
B: 105	22	: 38520	25	29.24	34.92	35.13
B: 106	20	: 48965	21	29.80	34.91	35.09
gop 1566077 (12 frames)				29.46	34.80	35.01
I : 110	16	:549227	18	29.33	34.73	35.05
B: 108	20	: 59220	22	29.04	34.28	34.42
B: 109	22	: 48501	25	28.54	34.19	34.20
P : 113	10	:353391	11	31.80	35.38	35.73
B: 111	22	: 40651	24	29.34	35.11	35.09
B: 112	26	: 29639	30	28.92	35.17	35.33
P : 116	12	:184021	13	31.23	35.25	35.49
B: 114	30	: 26870	33	28.76	35.04	35.03
B: 115	24	: 33437	27	29.16	35.02	35.14
P : 119	10	:275517	11	32.17	35.33	35.63
B: 117	20	: 34177	20	30.74	35.15	35.27
B: 118	20	: 33475	20	30.66	35.56	35.67
gop 1668126 (12 frames)				29.81	35.00	35.15
I : 122	16	:544605	17	29.56	34.83	35.18
B: 120	20	: 46755	22	29.90	34.04	34.13
B: 121	22	: 44273	25	29.15	34.79	34.88
P : 125	10	:323748	11	31.74	35.51	35.97
B: 123	24	: 33042	26	29.55	34.99	35.14
B: 124	26	: 30132	28	29.38	35.00	35.20
P : 128	12	:208273	13	31.10	35.14	35.58
B: 126	28	: 29261	31	29.57	35.36	35.47
B: 127	24	: 35030	25	29.52	34.89	35.14
P : 131	10	:282393	11	32.34	35.55	35.98
B: 129	22	: 32896	25	30.33	35.61	35.92
B: 130	22	: 35196	24	30.43	35.62	35.88
gop 1645604 (12 frames)				30.11	35.09	35.34
I : 134	16	:523895	17	29.87	35.00	35.42
B: 132	24	: 34077	28	29.06	34.75	34.88
B: 133	24	: 27963	27	29.76	34.16	34.23
P : 137	10	:304677	11	32.07	35.76	36.20
B: 135	24	: 23754	26	30.34	35.33	35.63
B: 136	24	: 22161	25	30.55	35.47	35.80
P : 140	10	:273488	11	32.08	35.57	35.98
B: 138	24	: 24016	28	30.53	35.62	35.98
B: 139	24	: 21363	26	31.08	35.31	35.60
P : 143	10	:255525	11	32.04	35.73	36.14
B: 141	22	: 29970	25	30.13	35.57	35.97
B: 142	22	: 25052	24	30.57	35.07	35.29
gop 1565941 (12 frames)				30.57	35.25	35.56
I : 146	18	:497390	20	28.62	34.06	34.41
B: 144	22	: 30256	24	30.01	34.44	34.48
B: 145	20	: 38618	21	29.86	34.94	35.14
P : 149	12	:250628	14	30.21	34.28	34.58
B: 147	20	: 42670	22	29.30	34.32	34.68
B: 148	20	: 43133	21	29.16	34.49	34.83
gop 902695 (6 frames)				29.49	34.41	34.68

total SNR (150 frames) 29.17 34.80 35.05
average bits/frame= 133647.426667
average bitrate= 4009422.800000 (30 Hz)
run-level 2 d vlc codedbit: 0.341062 bit/pel
additional bits: 0.054439 bit/pel
mv bits: 0.018591 bit/pel
mode bits: 0.012322 bit/pel

I : 86	8	:535332	8	35.63	42.12	42.50
B: 84	10	: 53778	10	34.77	41.41	41.56
B: 85	12	: 36948	12	34.54	41.40	41.48
P : 89	6	:295672	6	36.55	42.00	42.51
B: 87	12	: 31654	12	34.76	41.79	42.18
B: 88	12	: 30631	12	34.78	41.84	42.20
P : 92	6	:250311	6	36.59	41.97	42.47
B: 90	12	: 25796	12	35.15	41.88	42.26
B: 91	12	: 25513	12	35.09	41.83	42.23
P : 95	6	:246413	6	36.59	41.95	42.49
B: 93	12	: 28868	12	35.16	41.86	42.15
B: 94	12	: 29456	12	35.14	41.87	42.22
gop 1590372 (12 frames)				35.34	41.82	42.17
I : 98	8	:581258	8	34.94	41.69	42.11
B: 96	12	: 40819	12	34.56	41.65	41.89
B: 97	12	: 61567	13	32.62	41.19	41.30
P : 101	6	:416676	6	36.09	41.48	41.93
B: 99	14	: 41328	12	34.18	41.47	41.59
B: 100	20	: 20943	20	33.73	41.43	41.40
P : 104	8	:253143	8	34.39	41.05	41.33
B: 102	26	: 16868	27	33.62	41.26	41.24
B: 103	24	: 15316	24	33.33	41.12	41.00
P : 107	8	:255814	8	34.24	40.87	41.12
B: 105	22	: 16026	22	33.50	41.03	41.05
B: 106	20	: 17121	20	33.33	40.95	40.99
gop 1736879 (12 frames)				33.96	41.26	41.40
I : 110	8	:579373	8	34.89	41.58	41.97
B: 108	18	: 20208	18	32.36	40.91	40.75
B: 109	18	: 17459	18	32.74	41.19	41.15
P : 113	8	:232313	8	34.30	41.28	41.63
B: 111	16	: 18070	15	33.77	41.33	41.55
B: 112	14	: 28775	11	33.74	41.29	41.54
P : 116	8	:222162	8	34.22	41.18	41.56
B: 114	14	: 32148	11	33.83	41.23	41.42
B: 115	14	: 33106	12	33.53	41.12	41.41
P : 119	8	:248635	8	34.19	41.06	41.40
B: 117	14	: 40410	11	33.81	41.15	41.40
B: 118	14	: 41247	11	33.68	41.01	41.27
gop 1513906 (12 frames)				33.71	41.19	41.41
I : 122	8	:579243	8	34.94	41.71	42.13
B: 120	14	: 61997	12	32.35	40.88	40.98
B: 121	16	: 44308	15	31.78	41.27	41.27
P : 125	8	:253641	8	34.19	41.36	41.68
B: 123	16	: 39369	15	32.34	41.46	41.59
B: 124	16	: 39154	16	32.13	41.10	41.27
P : 128	8	:275220	8	34.08	41.24	41.59
B: 126	16	: 34065	14	33.04	41.14	41.18
B: 127	16	: 31494	15	32.24	41.07	41.16
P : 131	8	:252385	8	34.23	41.18	41.47
B: 129	16	: 34930	15	32.31	40.95	41.05
B: 130	16	: 30452	14	32.52	40.94	41.10
gop 1676258 (12 frames)				32.90	41.19	41.36
I : 134	8	:549290	8	35.27	41.97	42.41
B: 132	16	: 38177	14	32.23	41.11	41.33
B: 133	16	: 36053	15	32.12	41.27	41.51
P : 137	8	:231027	8	34.33	41.57	41.99
B: 135	16	: 22526	15	33.15	41.80	42.12
B: 136	14	: 45748	12	32.94	41.71	42.21
P : 140	8	:223072	8	34.37	41.04	41.51
B: 138	14	: 42734	12	33.04	41.50	41.95
B: 139	14	: 35586	12	33.45	41.38	41.80
P : 143	8	:246936	9	34.17	40.83	41.22
B: 141	14	: 43980	12	32.75	40.96	41.27
B: 142	14	: 50613	12	32.43	40.97	41.38
gop 1565742 (12 frames)				33.26	41.33	41.71
I : 146	10	:443906	11	33.57	41.05	41.32
B: 144	18	: 27325	19	31.44	40.35	40.38
B: 145	16	: 42281	15	31.62	40.24	40.44
P : 149	10	:155878	11	32.92	40.70	41.02
B: 147	16	: 41274	15	31.99	40.86	41.05
B: 148	12	: 63824	13	32.43	40.85	41.14
gop 774488 (6 frames)				32.27	40.67	40.88

total SNR (150 frames) 31.73 41.01 41.36
average bits/frame= 131850.146667
average bitrate= 3955504.400000 (30 Hz)
run-level 2 d vlc codedbit: 0.332506 bit/pel
additional bits: 0.057676 bit/pel
mv bits: 0.025242 bit/pel
mode bits: 0.013170 bit/pel

MPEG2 GCE model MBQ Zig/Vert 8955000 bit/sec
Sequence:/usr3/fl/flower 0 to 149

Mode:fr#	sq	bits	mq	SNR Y	Cb	Cr
I :	2	8 :649974	8	36.98	40.48	40.04
B:	0	16 :134633	16	32.36	37.95	38.36
B:	1	14 :108553	14	33.65	38.76	38.76
P :	5	8 :403379	8	36.07	38.79	38.41
B:	3	12 :103885	13	34.58	39.60	39.50
B:	4	10 :126248	10	35.39	39.90	39.58
P :	8	6 :549807	6	38.03	40.35	39.58
B:	6	8 :206233	8	36.52	39.75	39.20
B:	7	8 :195479	8	36.48	39.83	39.20
P :	11	6 :574403	6	37.94	40.23	39.42
B:	9	8 :203217	8	36.41	39.60	39.08
B:	10	8 :214584	8	36.34	40.05	39.49
gop 3470395 (12 frames)				35.57	39.54	39.19
I :	14	6 :838292	6	38.97	42.13	41.31
B:	12	10 :240398	10	34.56	38.42	38.10
B:	13	12 :113976	13	34.35	39.64	39.54
P :	17	6 :547327	6	38.01	40.51	39.54
B:	15	12 :103812	13	34.45	39.98	39.72
B:	16	12 : 88030	13	34.97	40.47	39.95
P :	20	6 :539685	6	37.70	40.04	39.08
B:	18	10 :206639	11	34.65	39.14	38.66
B:	19	12 :100784	13	34.28	38.89	38.44
P :	23	6 :534217	6	37.87	40.23	39.25
B:	21	10 :119495	10	35.27	39.24	38.56
B:	22	10 :109902	11	35.44	39.58	38.92
gop 3542557 (12 frames)				35.59	39.76	39.18
I :	26	8 :698128	8	36.77	40.33	39.58
B:	24	10 :182179	10	34.58	38.69	38.33
B:	25	10 :170789	11	34.38	38.67	38.38
P :	29	6 :549599	6	37.88	40.27	39.21
B:	27	10 :137126	11	35.19	40.27	39.60
B:	28	10 :129816	11	35.14	39.88	39.37
P :	32	6 :470122	6	37.77	40.45	39.45
B:	30	10 :104142	10	35.85	40.25	39.39
B:	31	10 :114906	10	35.57	40.05	39.47
P :	35	6 :518763	6	37.71	40.10	39.04
B:	33	10 :195440	11	34.60	39.16	38.65
B:	34	10 :159955	11	34.91	39.02	38.66
gop 3430965 (12 frames)				35.69	39.71	39.07
I :	38	8 :709235	8	36.53	40.10	39.21
B:	36	10 :124584	10	34.96	38.93	38.28
B:	37	10 :139487	11	34.49	38.98	38.48
P :	41	6 :532316	6	37.66	40.13	38.92
B:	39	10 :162216	11	34.54	39.34	38.87
B:	40	10 :149508	11	34.75	39.30	38.83
P :	44	6 :557467	6	37.51	39.80	38.73
B:	42	10 :136004	11	34.74	38.77	38.15
B:	43	10 :141374	11	34.84	39.50	38.74
P :	47	6 :545731	6	37.58	39.87	38.80
B:	45	10 :117743	11	34.93	39.45	38.57
B:	46	10 :125006	11	34.86	39.24	38.42
gop 3440671 (12 frames)				35.45	39.43	38.66
I :	50	8 :733263	8	36.35	39.84	38.99
B:	48	10 :193638	11	34.25	38.02	37.53
B:	49	10 :195946	11	34.02	38.33	37.93
P :	53	6 :539974	6	37.58	40.03	39.03
B:	51	10 :154717	11	34.10	38.72	38.33
B:	52	10 :221863	11	34.24	38.71	38.56
P :	56	6 :577634	6	37.50	39.79	38.75
B:	54	12 :121331	13	33.65	39.31	38.64
B:	55	12 :116882	13	33.57	38.83	38.21
P :	59	8 :420917	8	35.58	37.92	37.17
B:	57	12 : 98656	13	33.73	38.65	38.07
B:	58	10 :148865	11	34.35	38.31	37.68
gop 3523886 (12 frames)				34.71	38.82	38.20
I :	62	8 :744993	8	36.20	39.79	39.07
B:	60	10 :198616	11	34.05	37.24	36.66
B:	61	10 :260898	11	33.82	37.75	37.40
P :	65	6 :580757	6	37.39	39.64	38.60
B:	63	12 :117622	13	33.66	39.39	38.88
B:	64	12 :113165	13	33.73	39.53	38.85
P :	68	8 :363322	8	35.33	38.40	37.73
B:	66	12 : 64058	13	34.60	38.78	38.11
B:	67	10 :108600	11	34.69	38.62	37.90
P :	71	6 :621913	6	37.21	39.32	38.35
B:	69	10 :148689	11	34.52	38.95	38.31
B:	70	10 :152784	11	34.46	38.68	38.10
gop 3475417 (12 frames)				34.81	38.77	38.11
I :	74	8 :789174	8	35.89	39.52	38.89
B:	72	10 :136638	11	34.25	38.21	37.50
B:	73	10 :191175	11	33.57	38.04	37.63
P :	77	6 :598831	6	37.25	39.48	38.49
B:	75	12 :105668	13	33.15	38.75	38.44
B:	76	12 : 89684	13	33.59	38.64	38.17
P :	80	6 :572837	6	37.37	39.45	38.51
B:	78	12 : 87117	13	34.15	39.04	38.39
B:	79	10 :132794	11	34.56	38.71	38.11
P :	83	6 :542475	6	37.24	39.38	38.59
B:	81	10 :119254	11	34.90	38.85	38.18
B:	82	10 :116934	11	34.88	39.03	38.58
gop 3482581 (12 frames)				34.84	38.90	38.27

I :	86	8 :760030	8	36.25	39.83	39.07
B:	84	10 :207752	11	34.03	37.89	37.47
B:	85	12 :136593	13	33.15	38.26	37.83
P :	89	6 :535725	6	37.21	39.76	38.88
B:	87	12 : 72298	13	34.63	39.51	38.90
B:	88	10 :100014	11	35.11	39.57	38.92
P :	92	6 :610738	6	37.17	39.38	38.43
B:	90	10 :120242	11	34.91	39.38	38.63
B:	91	10 :118549	11	34.83	39.08	38.53
P :	95	6 :550111	6	37.12	39.30	38.49
B:	93	10 :109947	11	34.88	39.01	38.36
B:	94	10 :123237	11	34.65	38.90	38.35
gop 3445236 (12 frames)				35.15	39.12	38.47
I :	98	8 :756580	9	36.29	39.86	39.22
B:	96	10 :219814	11	33.97	37.66	37.35
B:	97	12 :228872	13	32.56	37.30	37.18
P :	101	6 :599149	6	37.11	39.28	38.45
B:	99	14 :147246	15	32.05	38.04	37.93
B:	100	14 :140475	15	32.20	38.25	37.98
P :	104	8 :451780	9	34.95	37.26	36.53
B:	102	14 :151958	15	32.00	37.65	37.31
B:	103	14 :137706	15	31.90	36.88	36.57
P :	107	8 :470381	9	34.90	37.12	36.48
B:	105	12 :236017	14	32.14	36.35	35.89
B:	106	14 :164260	15	31.61	35.95	35.99
gop 3704238 (12 frames)				33.13	37.51	37.13
I :	110	8 :792369	8	35.93	39.42	38.65
B:	108	14 :169788	15	31.54	35.80	35.62
B:	109	14 :170227	15	31.61	36.82	36.73
P :	113	8 :445483	9	34.89	37.28	36.52
B:	111	14 :124504	15	31.94	37.39	37.28
B:	112	12 :186862	14	32.41	37.71	37.24
P :	116	8 :473515	9	34.82	37.00	36.27
B:	114	12 :131377	14	32.61	36.56	36.17
B:	115	10 :187076	11	33.81	37.53	36.82
P :	119	8 :459423	9	34.78	36.98	36.22
B:	117	10 :128929	11	34.11	37.42	36.73
B:	118	10 :145546	11	33.76	37.16	36.53
gop 3415099 (12 frames)				33.29	37.19	36.67
I :	122	8 :778544	9	35.97	39.44	38.78
B:	120	10 :174622	11	33.56	36.85	36.27
B:	121	10 :246621	11	33.50	37.02	36.68
P :	125	8 :442962	9	34.85	37.41	36.74
B:	123	12 : 95484	14	33.47	38.53	38.06
B:	124	12 : 99666	14	32.89	37.36	36.97
P :	128	10 :342857	11	33.08	35.77	35.18
B:	126	12 :109242	14	32.68	36.53	36.18
B:	127	10 :188829	11	33.42	36.87	36.28
P :	131	8 :490120	9	34.49	36.58	35.98
B:	129	10 :112389	11	33.85	36.96	36.21
B:	130	10 :119124	11	33.72	36.83	36.13
gop 3200460 (12 frames)				33.71	37.09	36.53
I :	134	8 :805335	9	35.58	38.83	38.18
B:	132	10 :175157	11	33.21	36.32	35.95
B:	133	10 :190561	11	33.26	36.93	36.56
P :	137	8 :343388	9	34.63	37.67	37.33
B:	135	10 :133827	11	33.92	38.01	37.64
B:	136	10 :123371	11	33.84	37.95	37.60
P :	140	8 :426073	9	34.57	37.22	36.78
B:	138	10 :124497	11	33.69	37.39	37.18
B:	139	10 :121770	11	33.64	37.18	36.99
P :	143	6 :534624	7	36.35	38.30	37.76
B:	141	10 : 88850	11	34.52	38.00	37.38
B:	142	10 : 97934	11	34.24	38.12	37.56
gop 3165387 (12 frames)				34.20	37.61	37.20
I :	146	8 :817712	9	35.36	38.43	37.79
B:	144	10 :131159	11	33.67	37.11	36.81
B:	145	10 :208569	11	33.18	36.83	36.58
P :	149	6 :604600	7	36.26	37.85	37.29
B:	147	12 : 82142	14	33.26	38.00	37.61
B:	148	12 : 91566	14	32.91	37.68	37.32
gop 1935748 (6 frames)				33.94	37.62	37.21

total SNR (150 frames) 34.56 38.47 37.93
average bits/frame= 288217.600000
average bitrate= 8646528.000000 (30 Hz)
run-level 2 d vlc codedbit: 0.781121 bit/pel
additional bits: 0.071796 bit/pel
mv bits: 0.030663 bit/pel
mode bits: 0.018156 bit/pel

MPEG2 GCE model MBQ Zig/Vert 8955000 bit/sec N=12 M=
Sequence:/usr2/mc/mobile 0 to 149

Mode:fr#	sq	bits	mq	SNR Y	Cb	Cr
I :	2	8 :933951	8	34.69	38.58	39.15
B:	0	16 :201368	18	29.14	35.76	36.19
B:	1	18 :117163	20	28.93	36.21	36.64
P :	5	8 :474925	8	33.75	37.28	37.80
B:	3	16 :113286	18	29.98	37.16	37.64
B:	4	14 :144843	15	30.60	36.93	37.44
P :	8	8 :492309	8	33.81	36.92	37.41
B:	6	14 :137053	15	30.68	36.53	36.94
B:	7	14 :141746	15	30.59	36.43	36.90
P :	11	8 :443484	8	33.81	36.81	37.25
B:	9	14 :120518	15	31.10	36.49	36.87
B:	10	12 :161031	13	31.56	36.52	37.00
gop 3481677 (12 frames)				31.17	36.75	37.21
I :	14	8 :943391	8	34.79	38.60	39.14
B:	12	12 :169237	13	31.52	36.46	36.80
B:	13	12 :165864	14	31.42	36.56	37.08
P :	17	8 :375653	8	33.89	37.32	37.87
B:	15	12 :110859	13	32.39	37.41	37.87
B:	16	10 :159709	11	32.90	37.77	38.19
P :	20	8 :386807	8	34.00	36.79	37.33
B:	18	10 :138109	11	33.18	37.06	37.52
B:	19	10 :137899	11	33.10	37.56	37.94
P :	23	8 :397854	8	33.97	36.49	37.05
B:	21	10 :136926	11	33.13	36.80	37.25
B:	22	10 :138331	11	33.04	37.31	37.70
gop 3260639 (12 frames)				33.00	37.14	37.61
I :	26	8 :940205	8	34.68	38.55	39.04
B:	24	10 :151035	11	32.73	36.90	37.33
B:	25	10 :134712	11	32.91	37.30	37.78
P :	29	8 :329708	8	34.11	37.65	38.08
B:	27	10 : 93662	11	33.65	37.73	38.22
B:	28	10 : 99040	11	33.31	37.99	38.47
P :	32	6 :502027	6	36.35	38.61	39.06
B:	30	10 :134410	11	32.92	37.96	38.29
B:	31	10 :113680	11	33.38	38.14	38.54
P :	35	6 :484891	6	36.48	38.86	39.29
B:	33	10 :131134	11	33.14	38.14	38.45
B:	34	10 :133196	11	33.10	38.18	38.52
gop 3247700 (12 frames)				33.74	37.97	38.39
I :	38	8 :939112	8	34.69	38.53	38.97
B:	36	10 :168134	11	32.84	37.70	38.03
B:	37	10 :191636	11	32.56	37.45	37.90
P :	41	6 :583063	6	36.36	38.69	39.16
B:	39	10 :124891	11	33.55	38.19	38.65
B:	40	10 :131311	11	33.28	38.07	38.43
P :	44	8 :384903	8	34.10	37.63	37.99
B:	42	10 :128809	11	33.31	37.61	38.01
B:	43	10 :137069	11	33.10	37.97	38.35
P :	47	8 :412200	8	33.92	37.17	37.55
B:	45	10 :142801	11	33.11	37.27	37.67
B:	46	10 :134319	11	33.06	37.64	37.93
gop 3478248 (12 frames)				33.56	37.80	38.19
I :	50	8 :938277	8	34.71	38.57	39.03
B:	48	10 :172588	11	32.64	36.86	37.22
B:	49	10 :175651	11	32.71	37.38	37.68
P :	53	8 :381269	8	34.01	37.60	38.07
B:	51	10 :157530	11	33.18	37.63	38.05
B:	52	10 :153682	11	33.22	38.01	38.37
P :	56	8 :418638	8	33.89	37.09	37.59
B:	54	10 :189024	11	32.88	37.33	37.71
B:	55	10 :177124	11	32.82	37.37	37.75
P :	59	8 :428589	8	33.81	36.80	37.24
B:	57	10 :169870	11	32.76	37.13	37.54
B:	58	10 :163911	11	32.67	36.96	37.36
gop 3526153 (12 frames)				33.23	37.37	37.77
I :	62	8 :952096	8	34.69	38.46	38.85
B:	60	10 :209534	11	32.34	36.38	36.76
B:	61	10 :199810	11	32.34	36.97	37.32
P :	65	8 :433113	8	33.68	37.12	37.56
B:	63	10 :152214	11	32.88	37.78	38.18
B:	64	10 :149074	11	32.76	37.53	37.86
P :	68	8 :458536	8	33.69	36.71	37.17
B:	66	10 :174706	11	32.56	37.02	37.42
B:	67	10 :181964	11	32.57	36.97	37.35
P :	71	8 :461128	9	33.75	36.58	36.99
B:	69	10 :182623	11	32.59	36.81	37.15
B:	70	10 :185436	11	32.60	36.68	37.04
gop 3740234 (12 frames)				32.98	37.05	37.44
I :	74	8 :950014	9	34.66	38.41	38.84
B:	72	10 :238411	11	32.23	36.07	36.54
B:	73	12 :177304	14	31.19	36.61	37.02
P :	77	8 :456444	9	33.68	37.09	37.49
B:	75	12 :145359	13	31.69	37.48	37.80
B:	76	12 :139606	14	31.51	37.04	37.23
P :	80	8 :367276	9	33.92	36.98	37.33
B:	78	12 :136000	14	31.63	37.03	37.36
B:	79	10 :182232	11	32.67	36.90	37.27
P :	83	8 :354902	8	33.99	36.92	37.36
B:	81	10 :180295	11	32.61	36.93	37.29
B:	82	10 :163634	11	32.81	36.94	37.30
gop 3491477 (12 frames)				32.59	37.00	37.37

MPEG2 GCE model MBQ Zig/Vert 8955000 bit/sec N=12 M=3
Sequence:/usr5/pp/popple 0 to 149

Mode:	fr#	sq	bits	sqnt	SNR Y	Cb	Cr
I :	2	8	:472577	8	36.45	42.51	42.46
B:	0	16	:113218	15	32.59	38.99	39.45
B:	1	12	:123056	12	33.62	39.94	40.25
P :	5	8	:270510	8	35.45	40.99	41.15
B:	3	10	:141573	10	34.63	40.70	40.98
B:	4	8	:203031	8	35.53	41.22	41.39
P :	8	6	:398671	6	36.97	42.01	41.97
B:	6	8	:193875	8	35.60	41.34	41.41
B:	7	8	:190032	8	35.63	41.15	41.44
P :	11	6	:391154	6	36.93	41.95	41.88
B:	9	8	:187476	8	35.62	41.27	41.48
B:	10	8	:191199	8	35.59	41.20	41.38
gop 2876372 (12 frames)					35.20	41.01	41.20
I :	14	6	:635152	6	38.16	43.73	43.57
B:	12	8	:217158	8	35.30	40.88	41.04
B:	13	8	:211087	8	35.32	41.25	41.53
P :	17	6	:386223	6	37.01	42.41	42.29
B:	15	8	:188239	8	35.62	41.85	41.99
B:	16	8	:189583	8	35.62	41.64	41.81
P :	20	6	:398742	6	37.04	42.31	42.15
B:	18	8	:186120	8	35.63	41.62	41.72
B:	19	8	:184723	8	35.65	41.42	41.70
P :	23	6	:397441	6	37.05	42.18	42.18
B:	21	8	:188498	8	35.68	41.49	41.67
B:	22	8	:186166	8	35.66	41.47	41.67
gop 3369132 (12 frames)					36.06	41.80	41.90
I :	26	6	:618400	6	38.40	44.22	43.92
B:	24	8	:214093	8	35.47	41.21	41.38
B:	25	8	:204615	8	35.46	41.78	41.83
P :	29	6	:382202	6	37.06	42.79	42.68
B:	27	8	:191133	8	35.74	42.25	42.31
B:	28	8	:191687	8	35.73	42.08	42.11
P :	32	6	:388603	6	37.03	42.43	42.46
B:	30	8	:183533	8	35.74	41.86	42.00
B:	31	8	:184137	8	35.73	41.67	41.91
P :	35	6	:394847	6	37.13	42.32	42.26
B:	33	8	:185380	8	35.69	41.71	41.91
B:	34	8	:187056	8	35.68	41.60	41.76
gop 3325686 (12 frames)					36.15	42.10	42.17
I :	38	6	:617053	6	38.34	44.01	43.90
B:	36	8	:204308	8	35.40	41.29	41.48
B:	37	8	:198791	8	35.36	41.66	41.97
P :	41	6	:390060	6	37.08	42.40	42.59
B:	39	8	:181101	8	35.74	42.03	42.33
B:	40	8	:185464	8	35.71	41.86	42.22
P :	44	6	:390653	6	36.99	42.11	42.26
B:	42	8	:185705	8	35.72	41.63	41.89
B:	43	8	:180831	8	35.69	41.58	41.89
P :	47	6	:389243	6	37.00	42.07	42.14
B:	45	8	:182797	8	35.66	41.50	41.80
B:	46	8	:182193	8	35.59	41.39	41.70
gop 3288199 (12 frames)					36.11	41.91	42.14
I :	50	6	:625126	6	38.25	43.84	43.75
B:	48	8	:203407	8	35.42	41.11	41.32
B:	49	8	:200601	8	35.42	41.47	41.74
P :	53	6	:390436	6	37.04	42.45	42.45
B:	51	8	:186190	8	35.64	41.92	42.21
B:	52	8	:182328	8	35.70	41.79	41.97
P :	56	6	:408705	6	37.17	42.35	42.34
B:	54	8	:196141	8	35.67	41.46	41.74
B:	55	8	:196727	8	35.68	41.51	41.79
P :	59	6	:395714	6	37.13	42.43	42.28
B:	57	8	:197073	8	35.71	41.51	41.65
B:	58	8	:195431	8	35.73	41.58	41.64
gop 3377879 (12 frames)					36.13	41.90	42.03
I :	62	6	:599330	6	38.42	44.17	44.08
B:	60	8	:218207	8	35.46	41.36	41.54
B:	61	8	:221527	8	35.45	41.35	41.63
P :	65	6	:393590	6	37.20	42.64	42.67
B:	63	8	:223499	8	35.69	41.60	41.85
B:	64	8	:236120	8	35.69	41.55	41.81
P :	68	6	:392043	6	37.19	42.35	42.47
B:	66	8	:237348	8	35.73	41.40	41.80
B:	67	8	:227439	8	35.84	41.40	41.66
P :	71	6	:397244	6	37.26	42.54	42.62
B:	69	8	:231281	8	35.89	41.46	41.80
B:	70	8	:226114	8	35.94	41.61	41.77
gop 3603742 (12 frames)					36.22	41.89	42.09
I :	74	6	:529294	6	38.60	45.11	45.01
B:	72	8	:240107	8	35.81	41.57	41.87
B:	73	8	:238480	8	35.94	41.95	42.24
P :	77	6	:379133	6	37.45	43.69	43.52
B:	75	8	:234440	8	36.23	42.37	42.56
B:	76	8	:229459	8	36.28	42.56	42.63
P :	80	6	:378785	6	37.50	43.60	43.36
B:	78	8	:228783	8	36.34	42.55	42.48
B:	79	8	:229339	8	36.36	42.57	42.53
P :	83	6	:372462	6	37.50	43.57	43.32
B:	81	8	:228618	8	36.44	42.61	42.44
B:	82	8	:230310	8	36.42	42.54	42.53
gop 3519210 (12 frames)					36.67	42.80	42.81

I :	86	8	:945702	8	34.66	38.39	38.82
B:	84	10	:182139	11	32.64	36.48	36.83
B:	85	10	:193244	11	32.58	36.24	36.71
P :	89	8	:365485	8	34.05	37.49	37.94
B:	87	10	:182785	11	32.61	37.79	38.15
B:	88	10	:164785	11	32.90	37.62	37.94
P :	92	8	:389891	8	33.97	36.99	37.43
B:	90	10	:193648	11	32.50	37.21	37.59
B:	91	10	:182906	11	32.68	37.06	37.41
P :	95	8	:385018	8	33.99	36.83	37.19
B:	93	10	:196554	11	32.49	36.92	37.31
B:	94	10	:168826	11	32.69	36.77	37.13
gop 3550983 (12 frames)					33.08	37.11	37.50
I :	98	8	:952560	8	34.66	38.39	38.80
B:	96	10	:176622	11	32.58	36.81	37.04
B:	97	10	:154516	11	32.71	37.57	37.94
P :	101	8	:378124	8	33.83	37.77	38.20
B:	99	10	:127047	11	33.33	37.98	38.33
B:	100	10	:126224	11	33.19	37.94	38.19
P :	104	8	:392163	8	33.82	37.38	37.75
B:	102	10	:105306	11	33.39	37.37	37.74
B:	103	10	:114281	11	33.13	37.30	37.65
P :	107	8	:364156	8	34.14	37.21	37.52
B:	105	10	:152237	11	32.73	37.21	37.49
B:	106	10	:141526	11	33.09	37.26	37.51
gop 3184762 (12 frames)					33.34	37.50	37.82
I :	110	8	:950021	8	34.73	38.45	38.80
B:	108	10	:174068	11	32.72	36.87	37.16
B:	109	10	:190515	11	32.45	37.00	37.19
P :	113	6	:566035	6	36.42	38.76	39.28
B:	111	10	:144404	11	33.20	38.11	38.29
B:	112	10	:141754	11	33.14	38.05	38.37
P :	116	6	:452026	6	36.52	38.99	39.51
B:	114	10	:154925	11	33.41	37.89	38.21
B:	115	10	:143501	11	33.25	37.95	38.24
P :	119	6	:475475	6	36.60	38.71	39.20
B:	117	10	: 95062	10	34.28	37.88	38.25
B:	118	10	: 97362	11	34.22	38.30	38.59
gop 3585148 (12 frames)					34.02	38.04	38.37
I :	122	8	:933104	8	34.88	38.51	38.98
B:	120	10	:142045	11	33.39	36.67	37.07
B:	121	10	:162157	11	33.04	37.49	37.88
P :	125	6	:527230	6	36.42	39.00	39.56
B:	123	10	:134064	11	33.54	37.74	38.17
B:	124	10	:127089	11	33.66	37.96	38.38
P :	128	6	:519478	6	36.58	39.08	39.60
B:	126	10	:110369	10	34.26	38.93	39.27
B:	127	10	:113968	10	33.88	38.50	38.92
P :	131	6	:484477	6	36.65	38.97	39.55
B:	129	10	:106986	11	34.05	38.87	39.31
B:	130	10	:107562	11	34.18	39.01	39.43
gop 3468529 (12 frames)					34.38	38.33	38.77
I :	134	8	:900525	8	35.08	38.71	39.24
B:	132	10	:162318	11	32.92	37.28	37.85
B:	133	10	:122974	11	33.51	37.00	37.52
P :	137	6	:484661	6	36.52	39.19	39.80
B:	135	10	: 95912	11	34.00	38.36	38.86
B:	136	10	: 83292	10	34.36	38.63	39.10
P :	140	6	:503258	6	36.56	38.91	39.45
B:	138	10	:102679	11	33.83	38.87	39.40
B:	139	10	: 73417	10	34.50	38.41	38.83
P :	143	6	:471504	6	36.47	38.91	39.45
B:	141	10	:112930	11	33.50	38.37	38.93
B:	142	10	: 94053	11	33.86	37.54	38.01
gop 3207523 (12 frames)					34.43	38.29	38.82
I :	146	8	:941251	8	34.74	38.27	38.79
B:	144	10	:112846	11	33.55	37.10	37.47
B:	145	10	:105962	11	33.50	37.54	37.98
P :	149	4	:854234	4	40.14	41.09	41.48
B:	147	8	:178108	8	34.67	38.77	39.21
B:	148	12	: 72506	13	33.29	38.50	38.91
gop 2264907 (6 frames)					34.49	38.38	38.81

total SNR (150 frames) 33.25 37.53 37.94
average bits/frame= 289919.866667
average bitrate= 8697596.000000 (30 Hz)
run-level 2 d vlc codedbit: 0.796383 bit/pel
additional bits: 0.061572 bit/pel
mv bits: 0.020692 bit/pel
mode bits: 0.017726 bit/pel

I :	86	6	:480831	6	38.83	45.96	45.51
B:	84	8	:237247	8	36.32	42.58	42.46
B:	85	8	:238486	8	36.31	42.82	42.74
P :	89	6	:398580	6	37.53	44.06	43.89
B:	87	8	:231911	8	36.57	43.04	42.99
B:	88	8	:243198	8	36.51	42.80	42.92
P :	92	6	:429494	6	37.48	43.55	43.52
B:	90	8	:265811	8	36.48	42.44	42.56
B:	91	8	:279064	8	36.44	42.49	42.59
P :	95	6	:479773	6	37.37	43.04	43.16
B:	93	8	:293415	8	36.38	42.19	42.44
B:	94	10	:237041	10	35.37	40.97	41.27
gop 3814851 (12 frames)					36.72	42.86	42.90
I :	98	6	:611047	6	38.44	45.00	45.10
B:	96	10	:259317	10	34.97	40.62	40.98
B:	97	12	:219566	11	34.03	39.86	40.19
P :	101	6	:535575	6	37.19	42.75	43.08
B:	99	12	:218221	12	34.23	40.07	40.50
B:	100	14	:237572	11	33.71	39.84	40.19
P :	104	6	:568845	6	37.18	42.20	42.38
B:	102	16	:205194	13	33.10	38.80	39.30
B:	103	18	:192623	15	32.36	38.01	38.18
P :	107	8	:429507	8	35.59	40.73	41.04
B:	105	20	:174292	17	32.11	37.46	37.88
B:	106	18	:196277	15	32.43	37.89	38.20
gop 3848036 (12 frames)					34.19	39.81	40.14
I :	110	6	:691901	6	38.20	44.21	44.64
B:	108	18	:195284	15	32.22	37.49	38.08
B:	109	18	:202522	15	32.19	37.64	38.06
P :	113	8	:415439	8	35.71	41.05	41.60
B:	111	18	:194201	15	32.64	37.72	38.30
B:	112	18	:201598	15	32.63	37.68	38.25
P :	116	8	:412935	8	35.70	40.77	41.30
B:	114	18	:194209	15	32.85	37.63	38.23
B:	115	18	:200792	15	32.80	37.83	38.39
P :	119	8	:460382	7	35.70	40.58	41.02
B:	117	18	:195186	15	32.70	37.76	38.26
B:	118	18	:201789	16	32.61	37.63	38.16
gop 3566238 (12 frames)					33.48	38.60	39.14
I :	122	6	:753121	6	38.19	44.03	44.42
B:	120	18	:207516	16	31.99	37.23	37.70
B:	121	20	:201413	17	31.46	37.12	37.57
P :	125	8	:457910	8	35.43	40.84	41.31
B:	123	20	:191119	17	31.86	37.42	37.81
B:	124	20	:194814	17	31.63	37.16	37.59
P :	128	8	:477328	8	35.59	40.61	41.01
B:	126	20	:191829	17	31.74	37.10	37.49
B:	127	20	:192492	17	31.57	37.07	37.48
P :	131	8	:450797	8	35.44	40.38	40.79
B:	129	20	:189260	17	31.74	37.04	37.47
B:	130	20	:190629	17	31.63	37.08	37.50
gop 3698228 (12 frames)					32.72	38.14	38.56
I :	134	6	:773008	6	38.13	43.90	44.25
B:	132	20	:201801	17	31.31	36.81	37.20
B:	133	20	:208492	17	31.23	37.07	37.29
P :	137	8	:486239	8	35.52	40.84	41.17
B:	135	22	:181837	19	31.14	36.69	37.08
B:	136	22	:177774	19	31.00	36.64	36.96
P :	140	8	:477439	8	35.52	40.67	41.05
B:	138	22	:177661	19	30.99	36.75	36.89
B:	139	22	:176451	20	30.89	36.52	36.94
P :	143	8	:482171	8	35.51	40.42	40.81
B:	141	22	:184793	19	31.15	36.55	36.96
B:	142	22	:174537	19	30.96	36.45	36.87
gop 3702203 (12 frames)					32.20	37.74	38.09
I :	146	6	:763177	6	38.17	43.98	44.45
B:	144	24	:166066	21	30.61	36.03	36.41
B:	145	24	:157723	22	30.44	36.07	36.45
P :	149	8	:494466	8	35.50	40.89	41.45
B:	147	24	:162666	21	30.90	36.31	36.90
B:	148	24	:161568	21	30.68	36.11	36.50
gop 1905666 (6 frames)					31.90	37.38	37.82

total SNR (150 frames) 34.70 40.32 40.61
average bits/frame= 292636.280000
average bitrate= 8779088.400000 (30 Hz)
run-level 2 d vlc codedbit: 0.751903 bit/pel
additional bits: 0.114091 bit/pel
mv bits: 0.071876 bit/pel
mode bits: 0.018036 bit/pel

```
MPEG2 GCE model MBQ Zig/Vert 8955000 bit/sec N=12 M=3
      Sequence:/usr4/tb/table 0 to 149

Mode:fr#  sq  bits    mq  SNR Y   Cb    Cr
I  :    2  8 :920690  8  35.54 42.36 43.43
 B:     0 16 :135341 14  30.70 41.34 42.13
 B:     1 16 : 93975 15  31.07 41.45 42.32
P  :    5  8 :527787  8  34.41 41.05 42.44
 B:     3 14 :135460 12  31.79 41.88 42.70
 B:     4 14 :153649 12  31.49 41.47 42.48
P  :    8  8 :533020  8  34.41 40.99 42.28
 B:     6 14 :129263 12  31.51 40.83 41.93
 B:     7 14 :128183 12  31.69 41.04 41.99
P  :   11  8 :571800  8  34.50 40.63 42.09
 B:     9 14 :181567 12  31.41 40.90 41.99
 B:    10 16 :160795 14  30.41 40.46 41.74
gop 3671530 ( 12 frames) 32.11 41.17 42.27

I  :   14  8 :901298  8  35.50 42.37 43.39
 B:    12 18 :164446 17  29.30 40.67 41.60
 B:    13 20 :133951 19  28.72 41.23 41.96
P  :   17  8 :463740  8  34.32 41.32 42.59
 B:    15 20 : 99649 18  29.45 41.54 42.20
 B:    16 18 :115382 17  29.95 41.34 42.13
P  :   20  8 :497395  8  34.39 41.36 42.36
 B:    18 16 :136837 14  30.55 41.20 42.12
 B:    19 16 :117230 15  30.78 41.30 42.04
P  :   23  8 :547223  8  34.50 40.85 42.12
 B:    21 14 :165944 12  31.21 41.03 41.82
 B:    22 16 :175340 14  30.38 40.67 41.57
gop 3518435 ( 12 frames) 31.05 41.22 42.13

I  :   26  8 :677832  8  35.56 42.68 44.00
 B:    24 18 :223930 16  29.40 40.42 41.75
 B:    25 20 :166216 17  29.51 41.04 42.19
P  :   29  8 :424248  8  34.73 41.75 42.86
 B:    27 20 :127256 16  30.56 41.48 42.69
 B:    28 16 :175480 13  31.91 41.76 42.91
P  :   32  8 :384706  8  34.95 41.76 42.83
 B:    30 14 :212169 11  32.91 41.48 42.64
 B:    31 14 :183312 11  33.06 41.77 42.87
P  :   35  8 :350609  8  35.22 42.05 42.91
 B:    33 12 :137836 12  32.93 41.91 42.86
 B:    34 10 :179280 10  33.97 42.11 43.06
gop 3242874 ( 12 frames) 32.38 41.65 42.77

I  :   38  8 :447127  8  36.46 44.21 45.40
 B:    36 10 :170889 10  33.88 42.17 43.11
 B:    37 10 :154214 10  34.01 42.83 43.78
P  :   41  8 :297865  8  35.94 43.09 44.16
 B:    39 10 :137656 10  34.68 43.32 44.34
 B:    40  8 :194769  8  35.84 43.63 44.73
P  :   44  6 :402257  6  37.46 43.66 44.57
 B:    42  8 :193915  8  35.94 43.42 44.26
 B:    43  8 :206694  7  36.25 43.50 44.39
P  :   47  6 :390224  6  37.55 43.79 44.66
 B:    45  8 :204637  8  36.43 43.60 44.38
 B:    46  8 :194679  8  36.44 43.61 44.39
gop 2994926 ( 12 frames) 35.75 43.37 44.32

I  :   50  6 :503190  6  38.60 45.44 46.41
 B:    48  8 :214953  7  36.28 43.46 44.17
 B:    49  8 :192431  8  36.13 43.59 44.39
P  :   53  6 :380289  6  37.58 43.90 44.74
 B:    51  8 :192978  7  36.63 43.81 44.45
 B:    52  8 :188898  7  36.59 43.68 44.38
P  :   56  6 :378205  6  37.54 43.64 44.27
 B:    54  8 :181524  8  36.50 43.30 44.10
 B:    55  8 :182821  7  36.57 43.25 43.92
P  :   59  6 :391148  6  37.51 43.38 44.00
 B:    57  8 :167904  8  36.32 43.09 43.56
 B:    58  8 :192225  7  36.53 43.15 43.78
gop 3166566 ( 12 frames) 36.84 43.60 44.30

I  :   62  6 :524995  6  38.45 45.04 45.84
 B:    60  8 :200732  8  35.98 42.92 43.53
 B:    61  8 :182179  8  36.00 43.41 44.13
P  :   65  6 :384781  6  37.36 43.46 44.11
 B:    63  8 :176598  7  36.43 43.58 44.41
 B:    64  8 :163945  8  36.32 43.58 44.27
P  :   68  6 :673700  6  37.31 43.05 43.77
 B:    66  8 :235339  8  35.88 42.67 43.15
 B:    67 10 : 71786 10  34.60 42.47 43.14
P  :   71  6 :277381  6  36.68 42.67 43.40
 B:    69  8 :100545  8  35.74 42.60 43.32
 B:    70  8 :102898  8  35.76 42.58 43.24
gop 3094879 ( 12 frames) 36.28 43.12 43.80

I  :   74  6 :676699  6  37.39 43.26 43.86
 B:    72  8 :121440  8  35.47 42.54 43.19
 B:    73  6 :215343  6  36.56 42.71 43.46
P  :   77  4 :557637  4  40.04 44.20 44.96
 B:    75  6 :167167  6  37.09 43.72 44.41
 B:    76  6 :166565  6  37.07 43.73 44.41
P  :   80  4 :477728  4  39.97 44.24 44.98
 B:    78  6 :144263  6  37.43 43.90 44.65
 B:    79  6 :142659  6  37.37 43.85 44.62
P  :   83  4 :470726  4  39.98 44.26 45.05
 B:    81  6 :145150  6  37.37 43.94 44.69
 B:    82  6 :147700  6  37.38 43.99 44.71
gop 3433077 ( 12 frames) 37.55 43.66 44.38

I  :   86  4 :997434  4  40.97 45.68 46.48
 B:    84  6 :176542  6  37.01 44.00 44.81
 B:    85  6 :173171  6  37.07 44.02 44.93
P  :   89  4 :469046  4  39.98 44.82 45.85
 B:    87  6 :146312  6  37.28 44.50 45.56
 B:    88  6 :143488  6  37.29 44.50 45.51
P  :   92  4 :444648  4  39.98 44.80 45.78
 B:    90  6 :133234  6  37.41 44.52 45.51
 B:    91  6 :132911  6  37.35 44.52 45.48
P  :   95  4 :443101  4  39.99 44.76 45.79
 B:    93  6 :137042  6  37.47 44.51 45.41
 B:    94  6 :138278  6  37.47 44.48 45.45
gop 3535207 ( 12 frames) 38.06 44.57 45.53

I  :   98  4 :1080967 4  40.76 45.20 46.19
 B:    96  6 :185214  6  37.02 44.27 45.25
 B:    97  6 :234951  6  36.33 43.98 44.96
P  :  101  4 :647532  4  40.05 44.21 45.34
 B:    99  8 : 81938  8  36.16 44.06 44.88
 B:   100  8 : 76690  8  36.17 43.99 44.86
P  :  104  6 :344590  6  36.26 43.20 44.04
 B:   102  8 : 77995  8  35.96 43.61 44.37
 B:   103  6 :160235  6  36.51 43.46 44.31
P  :  107  4 :658667  4  40.05 43.89 44.86
 B:   105  6 :150247  6  36.90 43.71 44.57
 B:   106  8 : 69548  8  36.04 43.57 44.25
gop 3768574 ( 12 frames) 37.06 43.90 44.79

I  :  110  4 :1081520 4  40.79 45.18 46.07
 B:   108  8 : 97546  8  35.40 43.40 44.00
 B:   109  8 : 90115  8  35.45 43.77 44.54
P  :  113  4 :573078  4  39.99 44.29 45.45
 B:   111  8 : 61457  8  36.26 44.14 45.06
 B:   112  8 : 55580  8  36.27 44.07 45.00
P  :  116  4 :550191  4  39.95 44.20 45.35
 B:   114  8 : 60271  8  36.40 44.04 44.93
 B:   115  8 : 62010  8  36.27 43.92 44.78
P  :  119  4 :586023  4  39.98 44.10 45.23
 B:   117  8 : 73046  9  36.29 43.91 44.83
 B:   118  8 : 70659  8  36.47 43.77 44.78
gop 3361496 ( 12 frames) 37.07 44.05 44.97

I  :  122  4 :1080520 4  40.79 45.23 46.19
 B:   120  8 :113526  8  35.26 43.50 44.28
 B:   121  8 :136238  8  34.94 43.79 44.66
P  :  125  4 :623603  4  39.96 44.50 45.55
 B:   123  8 :111444  8  35.33 43.97 44.75
 B:   124  8 :117683  8  35.24 43.53 44.42
P  :  128  4 :663298  4  39.95 44.52 45.40
 B:   126  8 : 93355  8  35.82 43.41 44.08
 B:   127  8 :108187  8  35.27 43.59 44.19
P  :  131  4 :602559  4  39.96 44.39 45.26
 B:   129  8 :102568  8  35.55 43.31 44.03
 B:   130  8 : 94280  8  35.44 43.55 44.15
gop 3847261 ( 12 frames) 36.45 43.91 44.70

I  :  134  4 :1028743 4  40.88 45.64 46.45
 B:   132  8 :115400  8  35.27 43.84 44.57
 B:   133  8 :115969  8  35.19 43.95 44.72
P  :  137  4 :602946  4  39.99 44.72 45.61
 B:   135  8 : 81200  8  35.65 44.29 45.13
 B:   136  8 : 93514  8  35.50 43.90 44.95
P  :  140  4 :570717  4  39.98 44.39 45.23
 B:   138  8 : 82946  8  35.77 43.79 44.81
 B:   139  8 : 69213  8  36.12 43.96 44.92
P  :  143  4 :624738  4  40.01 44.11 45.08
 B:   141  8 : 90093  8  35.51 43.67 44.34
 B:   142  8 :102329  8  35.29 43.36 44.42
gop 3577808 ( 12 frames) 36.60 44.10 44.99

I  :  146  4 :1048299 4  40.91 45.54 46.35
 B:   144 10 : 66904 11  34.02 42.99 43.68
 B:   145 10 : 73864 11  33.95 42.75 43.39
P  :  149  4 :573119  4  39.94 44.59 45.68
 B:   147 10 : 60694 11  34.68 43.89 44.67
 B:   148 10 : 63582 11  34.38 43.67 44.50
gop 1886462 (  6 frames) 35.51 43.81 44.59

total SNR (150 frames)  34.95 43.07 43.96
average bits/frame= 287327.300000
average bitrate= 8619819.000000 ( 30 Hz )
run-level 2 d vlc codedbit: 0.787522 bit/pel
          additional   bits: 0.062760 bit/pel
          mv           bits: 0.027255 bit/pel
          mode         bits: 0.017059 bit/pel
```