(12) **United States Patent**
Zhang et al.

(10) **Patent No.:** US 7,039,116 B1
(45) **Date of Patent:** May 2, 2006

(54) **METHODS AND APPARATUS FOR EMBEDDING AND FORMAT CONVERSION OF COMPRESSED VIDEO DATA**

(75) Inventors: **Ji Zhang**, San Jose, CA (US); **Humphrey Liu**, Fremont, CA (US)

(73) Assignee: **Cisco Technology, Inc.**, San Jose, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 674 days.

(21) Appl. No.: **09/708,163**

(22) Filed: **Nov. 7, 2000**

(51) **Int. Cl.**
H04N 7/12 (2006.01)

(52) **U.S. Cl.** **375/240.26**; 709/247; 348/441

(58) **Field of Classification Search** 375/240.26, 375/240.28, 240.01, 240.16; 348/441, 454, 348/458, 512; 382/100, 243; 370/257, 328; 709/247
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

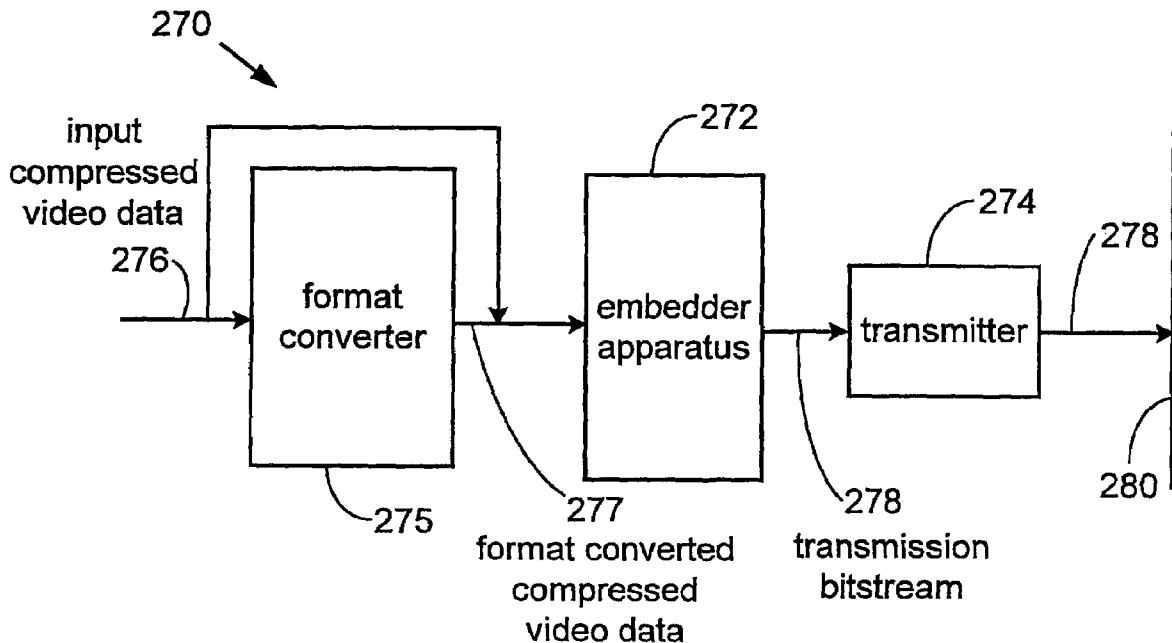|					
5,467,139	A	*	11/1995	Lankford	348/512
5,577,042	A	*	11/1996	McGraw et al.	370/257
5,729,535	A	*	3/1998	Rostoker et al.	370/328
5,768,535	A	*	6/1998	Chaddha et al.	709/247
6,507,618	B1	*	1/2003	Wee et al.	375/240.16
6,553,150	B1	*	4/2003	Wee et al.	382/243
6,553,566	B1	*	4/2003	Grant et al.	725/28
6,687,384	B1	*	2/2004	Isnardi	382/100

* cited by examiner

Primary Examiner—Gims Philippe
(74) *Attorney, Agent, or Firm*—Beyer Weaver & Thomas, LLP

(57) **ABSTRACT**

System and methods are provided for modifying a compressed video data stream to match the available video decoding capability of a target decoder. Compressed video content can be embedded in another compressed bitstream to allow more efficient usage of available channel bandwidth. Format conversion allows flexible transmission of video content even if the original format and available decompression capabilities are mismatched.
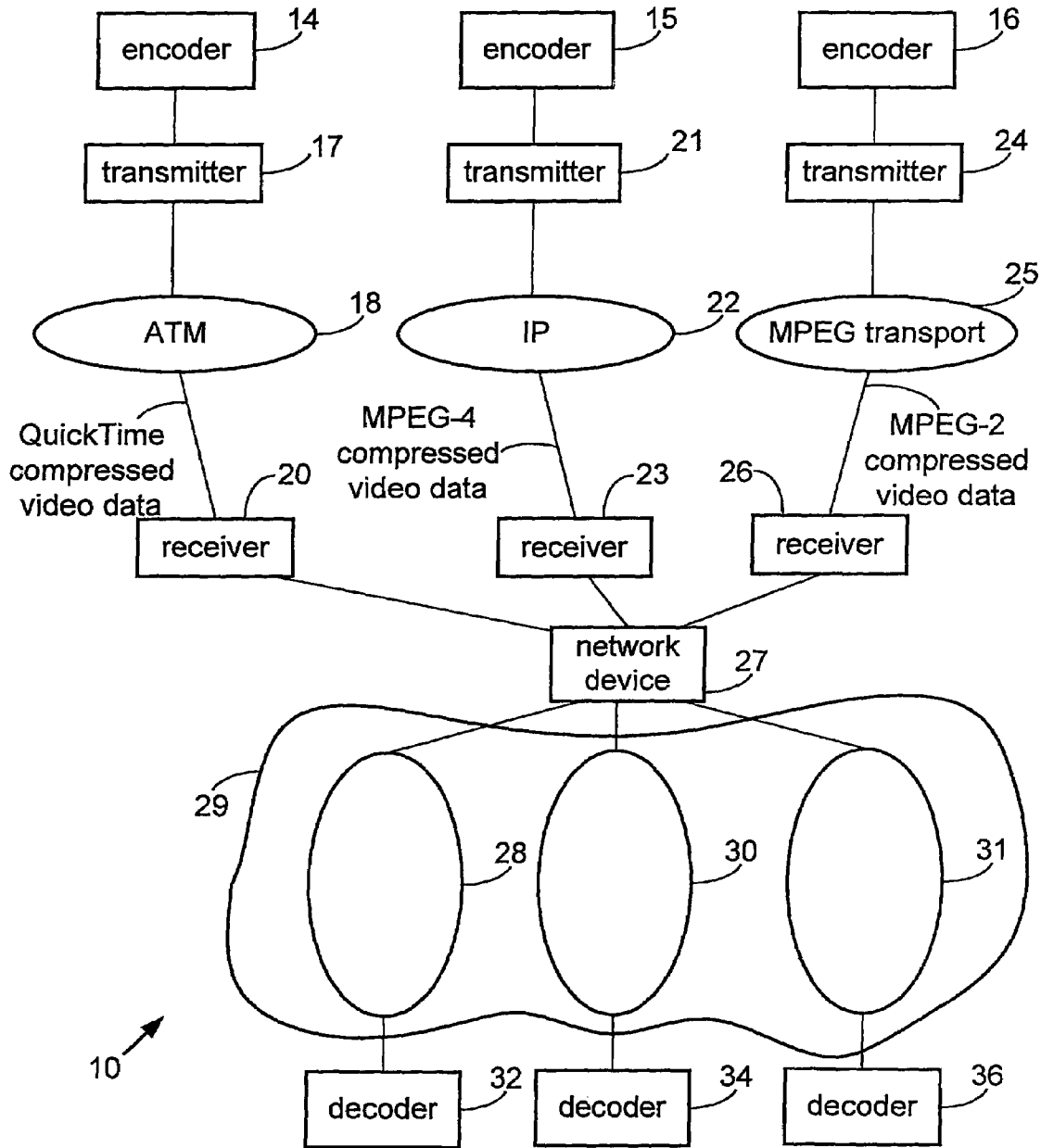
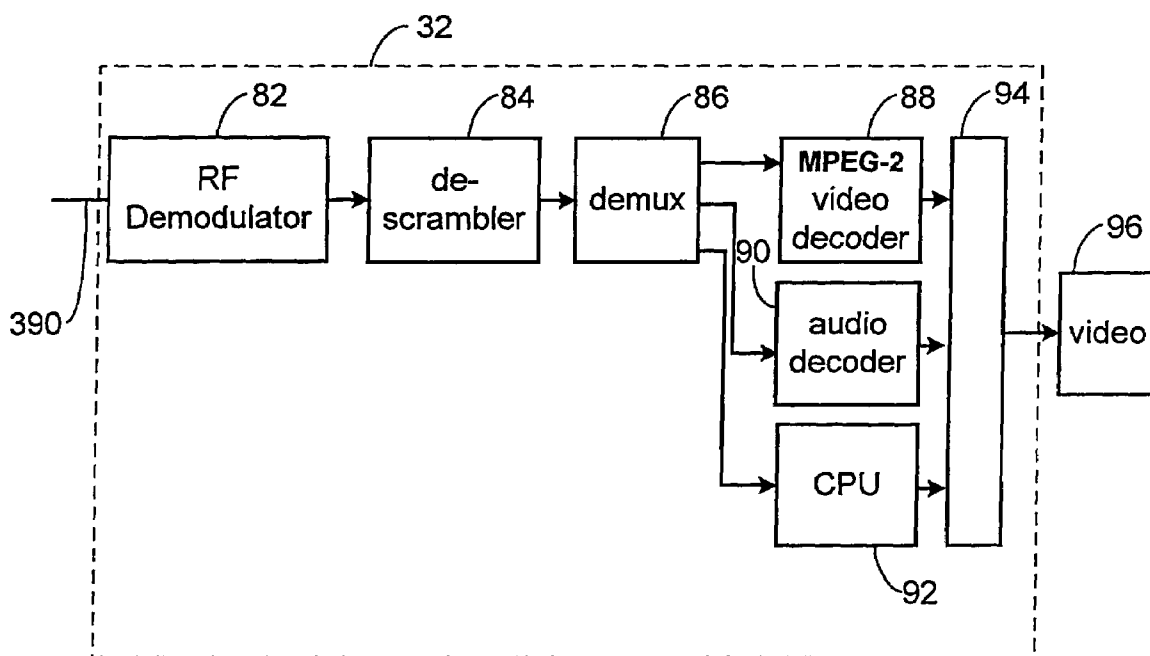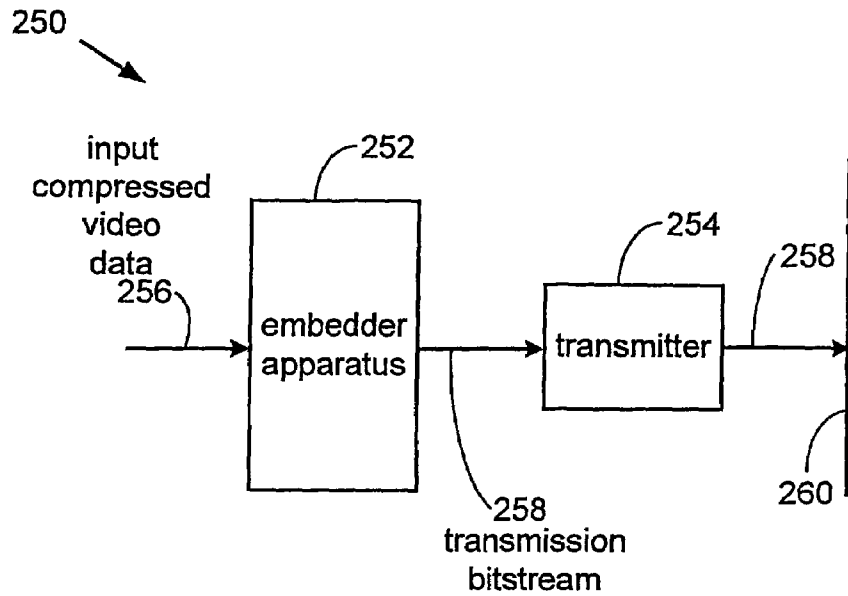**33 Claims, 10 Drawing Sheets**

Figure 1

32

82

84

86

88   94

RF
Demodulator

de-
scrambler

demux

MPEG-2
video
decoder

390

90

audio
decoder

96

video

CPU

92

Figure 2

250

input
compressed
video
data
256

embedder
apparatus
252

transmitter
254

258

258
transmission
bitstream

260

Figure 3A

270

input
compressed
video data
276

format
converter
275

embedder
apparatus
272

transmitter
274

278

277
format converted
compressed
video data

278
transmission
bitstream

280

Figure 3B

380

382

385

386

387

388

391

390

```
embedder
apparatus
```
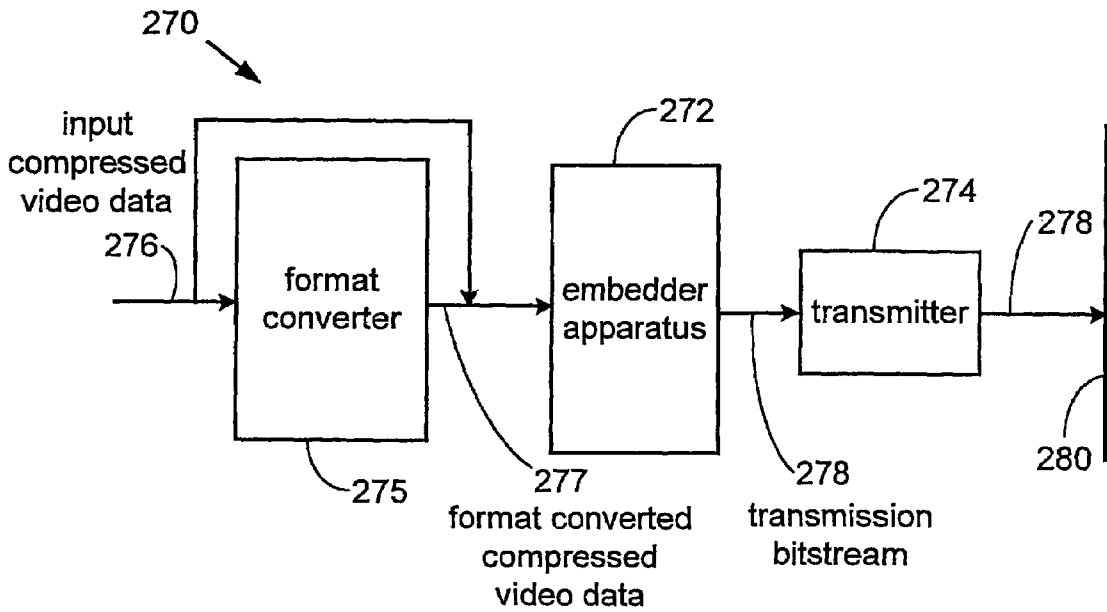
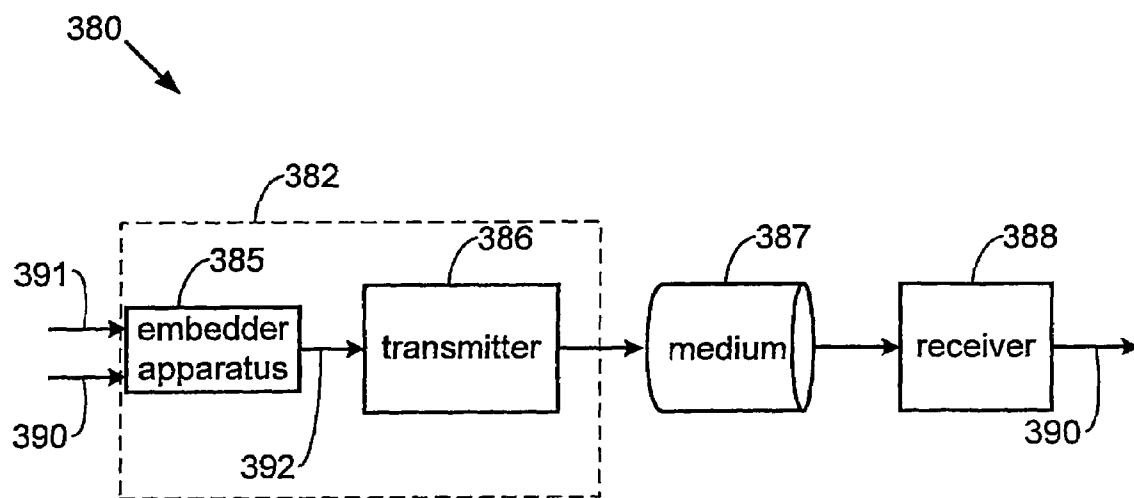transmitter

medium

receiver

392

390

FIG. 4

DOCKET ALARM

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts

Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research

With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips

Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.