



United States Patent [19]

[11] Patent Number: **5,521,925**

Merakos et al.

[45] Date of Patent: **May 28, 1996**

[54] **METHOD AND APPARATUS FOR PROVIDING MIXED VOICE AND DATA COMMUNICATION IN A TIME DIVISION MULTIPLE ACCESS RADIO COMMUNICATION SYSTEM**

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[75] Inventors: **Lazaros Merakos**, Arlington, Mass.; **Shrirang Jangi**, Germantown, Md.; **Fayu Li**, Waltham, Mass.

Primary Examiner—Benedict V. Safourek
Assistant Examiner—Ajit Patel
Attorney, Agent, or Firm—Gordon R. Lindeen, III; Wanda K. Denson-Low

[73] Assignee: **Hughes Aircraft Company**, Los Angeles, Calif.

[57] **ABSTRACT**

[21] Appl. No.: **118,709**

A system is described which integrates terminal traffic in a digital voice cellular radio communication system. Data is conveyed from remote data stations and remote radio telephone stations over a reverse channel TDMA frame. The allocation of time slots in the reverse channel TDMA frame is controlled at the base station. The base station provides priority to radio telephones having digitized voice traffic. The base station assigns time slots within the reverse channel TDMA frame based upon allocation requests received from radio telephone stations and remote data stations. Remote data stations may contend on a random access for a minority of a set of time slots in the reverse channel data frame. Additionally, they may request an assigned slot by inserting an allocation request in a control slot of the reverse channel data frame. The base station allocates time slots on a voice radio telephone priority, and assigns any excess time slots to data stations waiting for access to the reverse channel.

[22] Filed: **Sep. 9, 1993**

[51] Int. Cl.⁶ **H04J 3/16**

[52] U.S. Cl. **370/95.3; 379/63; 455/34.1; 455/54.2; 375/202**

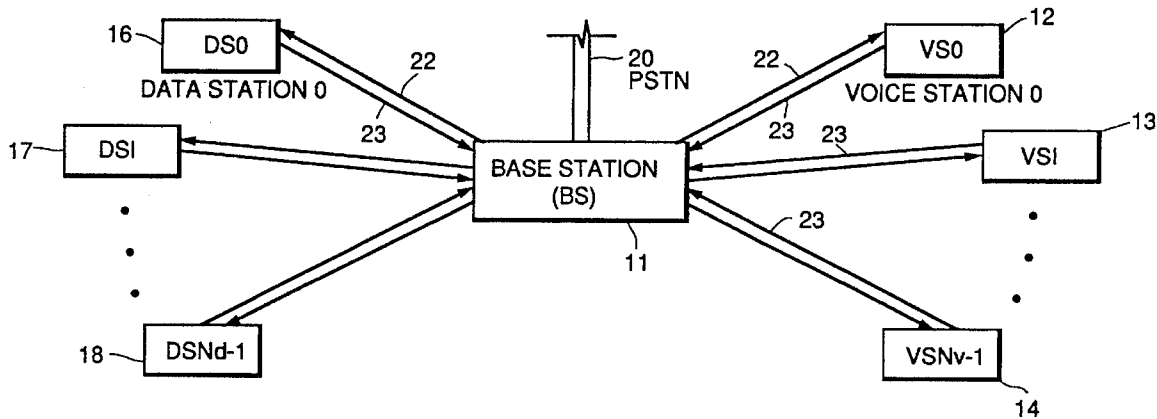
[58] **Field of Search** 370/94.1, 95.1-95.3, 370/79, 80, 81, 85.8, 85.6, 85.7; 340/825.08; 379/63; 455/34.1, 54.2; 375/202

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24 Claims, 7 Drawing Sheets



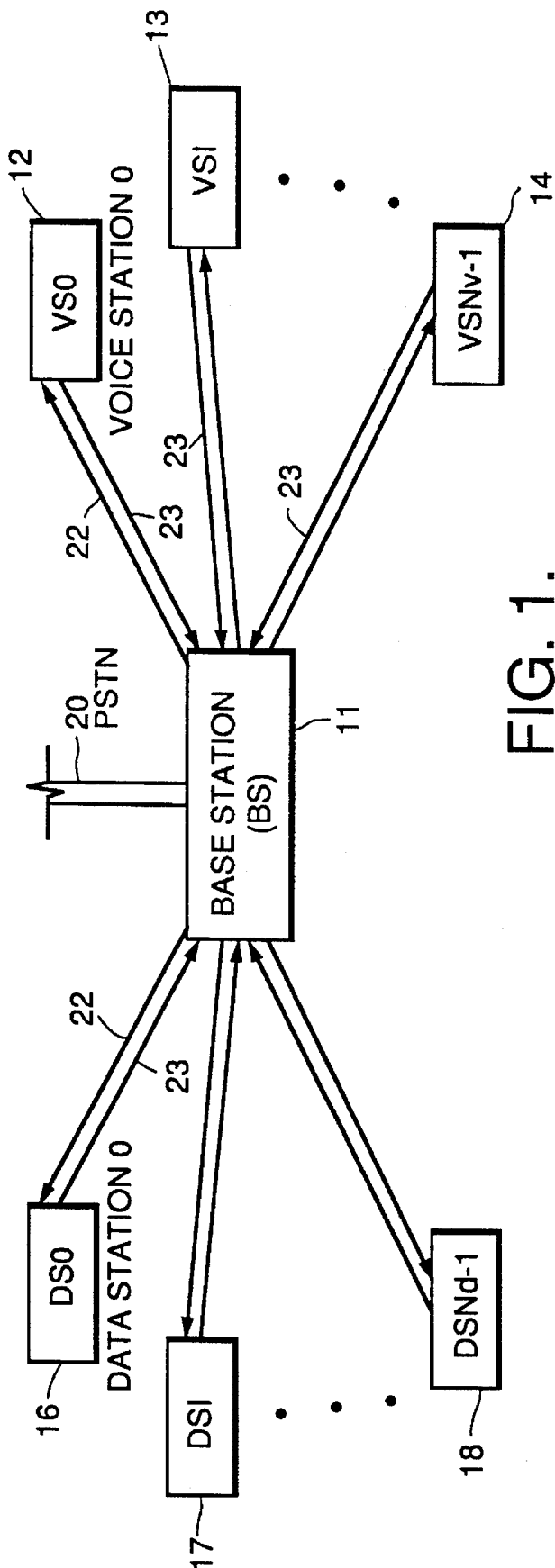
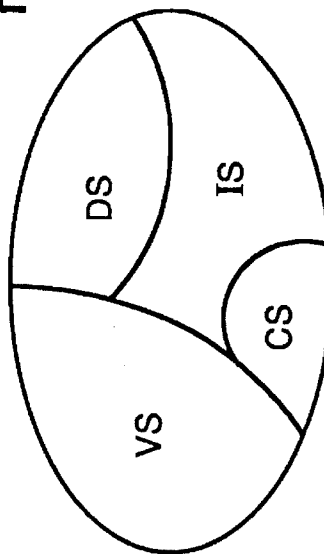


FIG. 1.

FIG. 2.



VS : SLOTS OCCUPIED BY VOICE STATION
DS : SLOTS OCCUPIED BY DATA STATION
CS : CONTROL SLOTS
IS : IDLE SLOTS

	SLOT 1			SLOT 2			SLOT 3			SLOT 4			SLOT 5			SLOT 6						
F1	RR 1	RA 2	RA 3	C ₁	C ₂	C ₃	C ₄	DATA			DATA			DATA								
F2	DATA			RA 4	RA 5	RR 2	RA 6	DATA			RANDOM			DATA								
F3	DATA			DATA			DATA			RR 3	RA 7	RA 8	RA 9	DATA			DATA					
F4	DATA			DATA			DATA			RA 10	RA 11	RR 4	RA 12	DATA			DATA					
F5	DATA			RANDOM			DATA			DATA			RR 5	RA 13	RA 14	RA 15	C ₅	C ₆	C ₇	C ₈		
F6	DATA			DATA			DATA			DATA			DATA			DATA			RA 16	RA 17	RR 6	RA 18

FIG. 3.

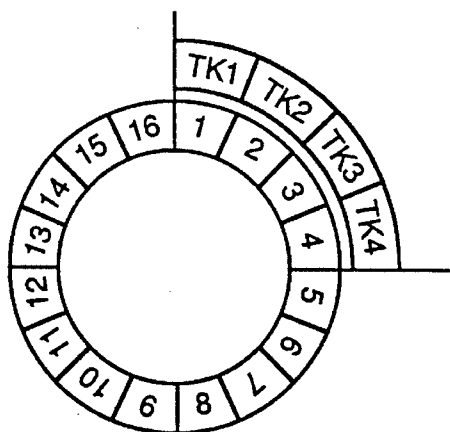


FIG. 4 a.
FRAME 1

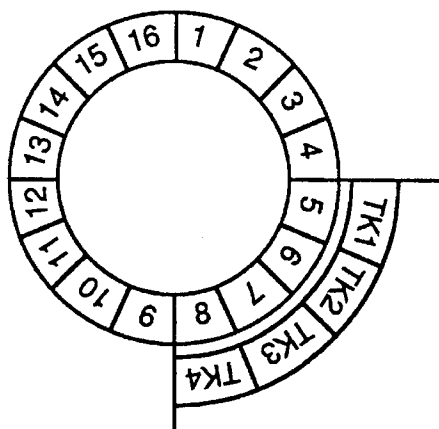


FIG. 4 b.
FRAME 2

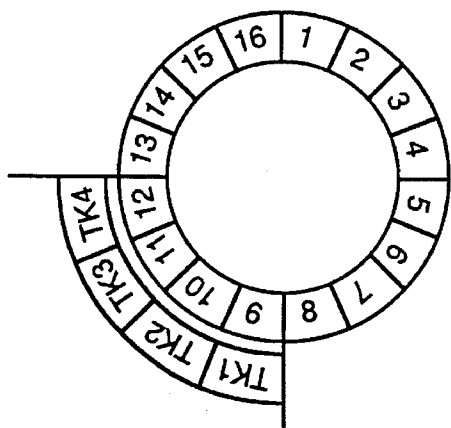


FIG. 4 c.
FRAME 3

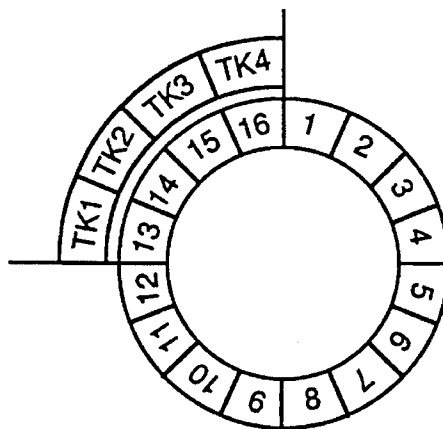


FIG. 4 d.
FRAME 4

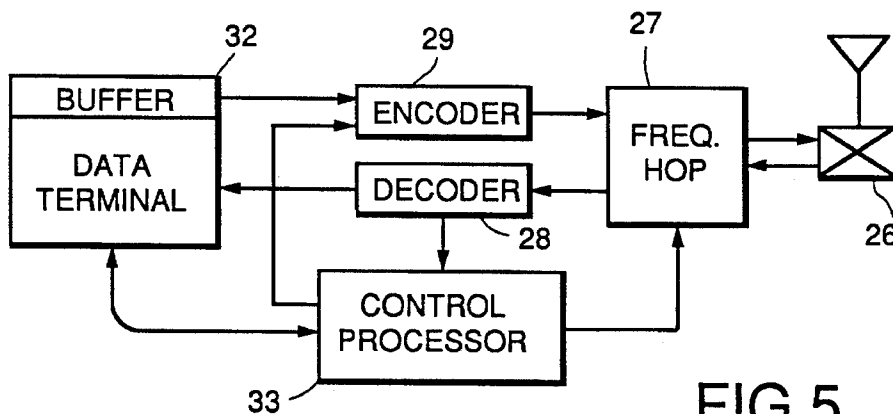


FIG. 5.

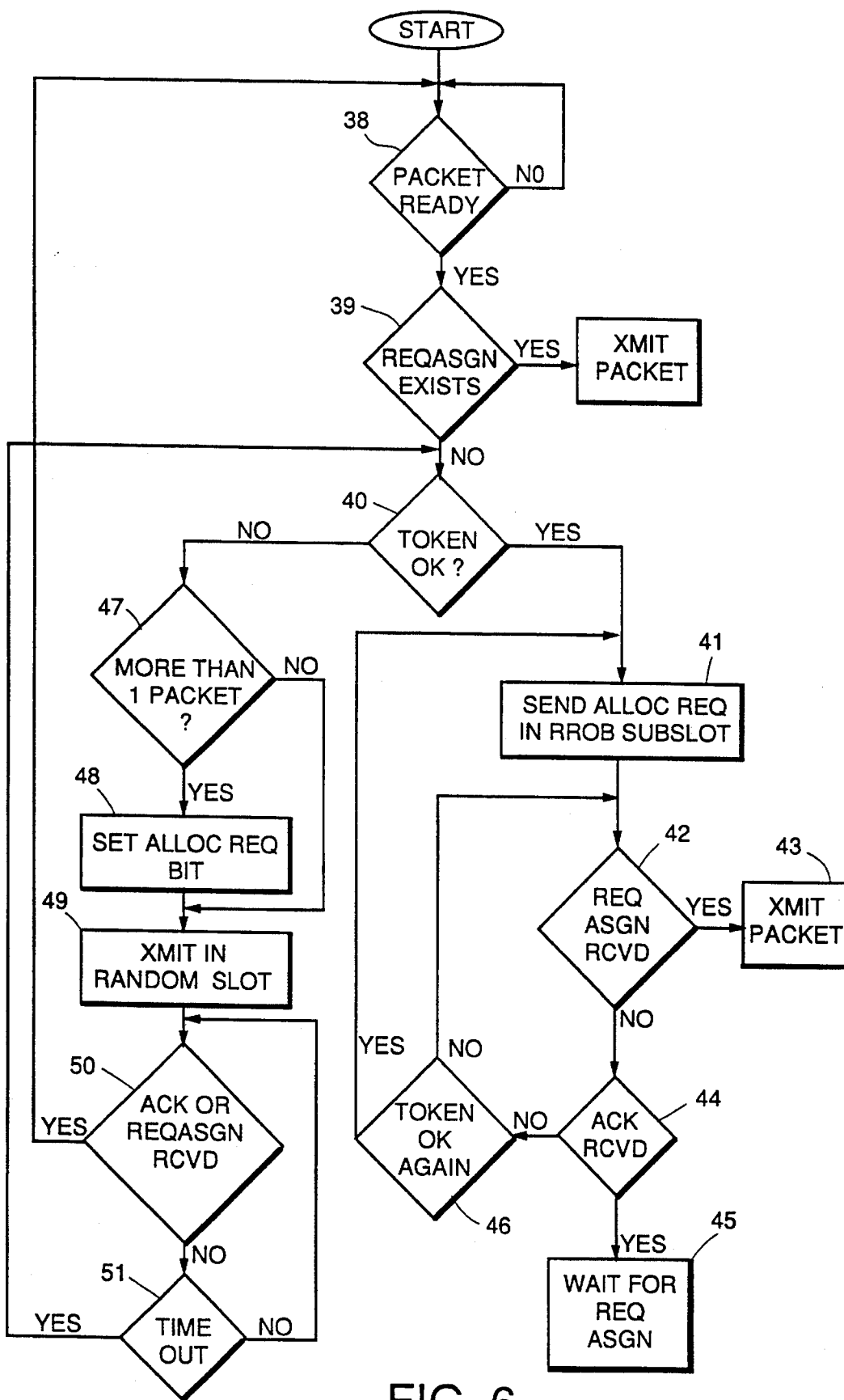


FIG. 6.

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