



**MODELS 732 AND 733** 



**ASR** Model 732 ASR with BAUDOT/CCITT code and Model 733 ASR with USASCII code . . . available with single or twin magnetic tape cassettes.

# AUTOMATIC SEND-RECEIVE

ASR terminals combine 30 characters per second printing, keyboard operation and dual/single cassette storage. KSR models easily convert to ASR models.

#### QUIET OPERATION

TI's unique solid state printhead eliminates the undesirable noise associated with impact printing, and coupled with magnetic tape cassettes, assures virtually silent operation.

#### SOLID STATE RELIABILITY

TI MOS/LSI integrated circuits, solid state printhead, and reliable accurate, digital grade magnetic tape are keys to reliable, long-life operation.

# FEATURES

# AUTOMATIC CR/LF

CR (carriage return) and LF (line feed) are automatically activated but not transmitted when the printhead reaches the right hand margin.

# STANDARD FEATURES

- Switch-selectable half or full duplex operation, single or double line spacing.
- 5 x 7 dot matrix with print contrast control
- EIA RS-232-C serial interface
- Single enclosure
- For ASR models, ANSI-compatible (Phillips-type) cassettes.

# KSR and ASR Models

# **MODEL 732**

The Model 732 KSR and Model 732 ASR utilize Baudot/CCITT code with either US or UK character sets. It has switch selectable speeds of 50, 75, and 100 Baud.

#### MODEL 733

The Model 733 KSR and Model 733 ASR utilize USASCII code, switch selectable speeds of 10, 15, and 30 characters per second, and switch selectable odd, even, or mark parity generation.

#### 732/733 COMMON

• Answerback Memory: Diode matrix memory transmits serially up to 21 Baudot or USASCII 'characters as a "station identification". The answerback memory is activated locally by the HERE IS key. Model 733 maybe remotely enabled via receipt of the ENQ character. Model 732 is triggered remotely via serial receipt of the FIGURES character followed by the D character. As a strappable suboption, the printer and/or the RECORD may be blinded from the answerback contents.

## **OPTIONS/ACCESSORIES**

- 300 Baud dc-Current Loop Serial Interface: Option converts standard internal EIA RS-232-C voltage level to current signals.
- Single Cassette (ASR units only)
- Terminal Stand: Walnut grained, fixed position stand 24. in square by 25 in. high provides support for data terminal with rear opening cabinet for paper storage or additional electronics.
- Automatic Paper Spooler: Unit providing separate drive motor for silent take up of printed pages; spooler can be bolted to the rear of the terminal or placed stand-alone at the rear of the terminal. Spooler adds 7 in. to terminal depth.

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**KSR** Model 732 KSR with BAUDOT/CCITT code and Model 733 KSR with USASCII code . . . KSR models that can be easily upgraded to ASR models.

# ADDITIONAL OPTIONS FOR MODEL 733 (● indicates Model 733 ASR/KSR) (♦ indicates Model 733 ASR only)

• Built-in 300 Baud Modem: DS100 data sets provide Bell 100 series compatible frequency shift keying in a choice of operational modes. Terminals may be equiped with either the "Originate" or "Answer" mode configuration for half- and full-duplex operation over voice-grade unconditioned lines. DS100 Modems are completely housed within the terminal enclosure and may access the Bell System DDD Network via a type CDT Data Access Arrangement. Private wire applications require either a 2- or 4-wire type 3002 line (no-conditioning).

MODEL MODE		TRANSMIT FREQUENCIES*	RECEIVE FREQUENCIES*
DS100 ATL	ORIGINATE	1070 Hz Space 1270 Hz Mark	2025 Hz Space 2225 Hz Mark
DS100 ATH	ANSWER	2025 Hz Space 2225 Hz Mark	1070 Hz Space 1270 Hz Mark

 Transmitter output level
 0 to -15 dbm, adjustable

 Receiver input level
 5 to -35 dbm, sensitivity

 Speed: Up to 30 characters/second, asynchronously.

\*All frequencies ± 1%.

300 Baud Automatic Answer: Permits unattended terminals to automatically answer calls over the Bell System DDD Network. Automatic Answer (Part Number 960984-0001) connects to a Bell type CBS Data Access Arrangement and works in conjunction with the built-in DS100 ATH "Answer" mode modem. Part number 960984-0002 provides an EIA RS-232-C connector for attachment to a Bell 103A Data Set (with Auto-Answer option), or equivalent.

#### Features

- Automatic triggering of the Answerback Memory option (if installed) with an adjustable time delay of 0.6 msec to 10 sec. Automatic triggering requires either Remote Device Control or Automatic Device Control.
- ♦ Automatic Device Control (ADC): Provides recognition of the ASCII DC1, DC2, DC3, DC4 (X-ON, TAPE, X-OFF, TAPE) commands for automatic start/stop of the Record and Playback functions. Automatic Device Control Option (Part No. 971481-0001) provides recognition of the EOT character for controlled disconnect of calls in conjunction with the 300 Baud Automatic Answer option. (Early versions of this option [Part No. 960891] do not provide this feature.) DC 1-4 commands may be strapped (via pencil switch) to respond to local data, received data or transmitted data (see Remote Device Control). Unless specified, option is factory pre-set to respond in all modes. An operator accessable Master On-Off switch is provided to completely disable all Device Control functions.
- ◆ Automatic Search Control (ASC): Option enables the Model 733 ASR to perform a "content oriented" search of data stored on tape. A character string identifier (from 1 to 16 non-control characters) is entered into a random access memory. Upon actuation of playback control, the search proceeds, without printout, at 3.0 blocks/sec (250 char/sec max) until a match is made. Control characters are transparent to the length of the character string identifier as well as the criteria for matching data on tape.
- Search may be used in the LOCAL mode for locating data stored on tape. High speed tape to tape duplication during search allows increased editing flexibility permitting the operator to duplicate, "up to a point" without generation of hard copy. Remote search is possible in the ON-LINE mode with the addition of the Remote Device Control option. Remote Duplication is not possible.

#### Features (Continued)

- Blinding of printer and record functions upon automatic disconnect.
- Long SPACE disconnect for termination of call in progress; a continuous logical zero of at least 1.28 seconds is required from the transmitting end.
- EOT disconnect terminates a call in progress via receipt of the End of Transmission character. Use of this feature requires that the terminal also have the Remote Device Control or (Part No. 971481-0001) Automatic Device Control options.

#### Indicators

- TERMINAL READY: Light remains on as long as the Master On-Line Switch is on-line indicating the terminal will answer a call.
- RING INDICATOR: Flashes to signal incoming call; glows steadily after the call is answered and until carrier is detected.
- LINE READY: Illuminates when the terminal has answered the call, received carrier, and is ready to transmit or receive.
- NOTE: Unless specified, standard answerback memory delay is factory pre-set to 1.28 sec.
- Full ASCII Keyboard: Standard Models 733 ASR and KSR will decode and print lower case data. Lower case information may be received from the LINE and recorded or printed. The Full ASCII Keyboard option enables the user to generate lower case data (columns 6 and 7 of the USASCII code see page 6) from the keyboard for LOCAL recording or direct transmission. The option provides an UPPER CASE ONLY key which prevents the Full ASCII Keyboard from generating lower case data for those periods when the user does not desire lower case.

ASC O	peration
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	LOCAL MODE		REMOTE MODE				
Request	ESC and \$ keyed	ESC and \$ keyed	ESC and \$ received				
Acknowledgement	Carriage Return/ Line Feed	Carriage Return/ Line Feed	None				
Search Criteria	1-16 character, identifier keyed	1-16 character, identifier keyed	1-16 character, identifier received				
Initiation	Playback (Cont Start) On or DC1	Record turned on, Playback (Cont Start) On or DC1	DC1 received				
End of Search Acknowledgement	Carriage Return/ Line Feed	Carriage Return/ Line Feed	See Status Char- acter, Remote Device Control				

 1200 Baud Transmission: 120 character/sec communication rate is achieved in a tape to line to tape mode. Recorded data is sent to the communication line via an EIA RS-232-C interface for use with Bell 202 C, D, or R compatible data sets.

1200 Baud transmission optimizes the available bandwidth of voice grade lines and provides the user maximum point to point, halfduplex, communication speed. Inbound data is recorded at transmission speed for local 300 Baud printout after the call is completed. 10, 15, 30, and 120 character/sec operation is possible via dual external modems (Bell 103 compatible for up to 300 Baud and Bell 202 compatible for 1200 Baud).

### - OPTIONS CONTINUED -

♦ Remote Device Control (RDC): Enables the Model 733 ASR to be controlled via data received from the communication line. Remote Device Control provides all single character commands common to the Automatic Device Control plus a number of dual character commands listed in the table below. The less obvious commands are described below the table. In addition, the option may be strapped to recognize the DC1 through DC4 commands when they are contained in local data, received data, or transmitted data via the lower table.

#### Remote Device Control (Continued)

Additional features of the Remote Device Control provide for automatic blinding of the printer function. Once a Data Link Escape (DLE) character is received, the printer is inhibited from printing the next character received. As well, the strappable automatic error detect feature causes automatic transmission of the CAN or cancel character when a playback error is detected. This feature is factory pre-set not to transmit and must be requested to be made operational.

# **REMOTE DEVICE CONTROL COMMANDS1**

_	COMMAND	CODE		CODE	
1.	PLAYBACK ON	DC1	11.	CASSETTE 2 IN RECORD MODE	DLE6
2.	RECORD ON	DC2	12.	BLOCK FWD	DLE7
3.	PLAYBACK OFF	DC3	13.	BLOCK REV	DLE8
4.	RECORD HALT	DC4	14.	PRINTER ON	DLE9
5.	AUTO-DISCONNECT PHONE LINE <sup>2</sup>	EOT	15.	PRINTER OFF	DLEO
6.	REWIND CASSETTE 1	DLE1	16.	ADC ENABLE	DLE:
7.	REWIND CASSETTE 2	DLE2	17.	ADC DISABLE	DLE;
8.	LOAD CASSETTE 1	DLE3	18.	REQUEST STATUS	DLE<
9.	LOAD CASSETTE 2	DLE4	19.	1200 BAUD PRINT LOCAL <sup>3</sup>	DLE>
10.	CASSETTE 1 IN RECORD MODE	DLE5	20.	CANCEL REMOTE SEARCH <sup>4</sup>	DLE?

NOTES: 1. Commands 5 through 20 are only effective if the appropriate functions are in the LINE mode, e.g., RECORD, PLAYBACK, PRINTER. Further, it is not possible to remotely change a LINE/LOCAL status from LOCAL to LINE or LINE to LOCAL.

- 2. When unit is equipped with 300 Baud Auto-Answer.
- 3. For use with future 1200 Baud developments.
- 4. When unit is equipped with Auto Search Control.

# PRINTER OFF:

Command disables the printer from receiving line data. If this code sequence is received when the printer is in either the LINE or LOCAL mode the printer is disabled while it is in the LINE mode. This function is reset and reverts to the "Printer On" condition when the terminal is taken OFF LINE or when power is turned OFF and ON.

#### PRINTER ON:

Command restores printer functions, if in the LINE mode, after having been disabled.

#### CANCEL REMOTE SEARCH:

Command causes remote search in process to be cancelled.

#### ADC DISABLE:

Command disables the recognition of the DC 1-4 characters. Extremely useful, in allowing the transmission of new format tapes (operator lead through) to the remote terminal from a central location. Reverts to the "ON" condition when the terminal is taken OFF LINE or power down is experienced.

#### ADC ENABLE:

Command restores recognition of the DC 1-4 characters after having been disabled.

#### **REQUEST STATUS:**

Command causes the terminal to transmit a single ASCII character indicating the status of the PLAYBACK, RECORD and PRINTER functions. See Status Character Response Table.

#### STATUS CHARACTER RESPONSE

BIT 1	BIT 2	BIT 3	BIT 4	BIT 5	BIT 6	BIT 7*
PLYBK	PLYBK	CAS 1 CI. Leader	CAS 2 CI. Leader	REC	PRINT	Search in Process
Rdy-1	Error-1	ON-1	ON-1	Rdy-1	Rdy-1	NO-1
Not Rdy-0	No Error-0	OFF-0	OFF-0	Not Rdy-0	Not Rdy-0	YES-0

\* Factory pre-set to constant logical 1 unless otherwise requested.

#### DC CHARACTER RECOGNITION<sup>1</sup>

PENCIL SWITCH (S2)2	LOCAL DA	LOCAL DATA <sup>3</sup>		EIVED FROM LINE <sup>3</sup>	DATA TRANSMITTED TO LINE <sup>3</sup>
PLAYBACK ON (DC1)	ADC	RDC	ADC	RDC	Always Disabled
PLAYBACK OFF (DC3)	Rocker 3	Rocker 3	Rocker 2	Rocker 4	ADC: Rocker 1/RDC: Rocker 5
RECORD ON (DC2)	ADC	RĐC	ADC	RĐC	Always Disabled
RECORD OFF (DC4)	Rocker 5	Rocker 1	Rocker 4	Rocker 2	Always Disabled

NOTES: 1. Table applies to both Remote Device Control and Automatic Device Control (Part No. 971481) options.

2. Factory pre-set to enable recognition on all five selections unless otherwise requested.

3. Switch Rockers in the ON position allow recognition of DC character(s) received from data sources.

#### **MODELS 732 AND 733 GENERAL SPECIFICATIONS**

#### 1. Printer

#### A. Friction-feed platen

- B. Line length: 8 inches (80 characters/line, 10 characters/inch).
- C. Line Spacing: Switch-selectable 3 or 6 lines/inch.
- D. Complete visibility of printed data, including the line being printed and the character just printed.
- E. Enclosure contains space for printing paper: 8 1/2 in. wide x 300 ft. long x 3 5/8 in. diameter roll.
- F. Character font: standard models print characters from 5 x 7, 35dot matrix printhead, character size 0.105 in. x 0.080 in. On standard Model 733, lower-case received data is printed from 5 x 5 matrix, character size 0.0715 in. x 0.080 in.; with optional full USASCII keyboard, lower-case alphabet is also generated.
- G. Carriage return/line feed (CR/LF) automatic at column 81, no code is transmitted. Maximum time for: (1) CR is 195 ms from any column, (2) LF (single space) is 33 ms, and (3) LF (double space) is 67 ms.
- 2. Printing Paper
  - TI thermographic printing paper, No. 213714 (white).
- 3. Paper Out Indication

Last 10 ft. of TI thermographic printing paper roll is color coded.

4. Keyboard

'Two-key roll over" electronically prevents transmission when two keys are depressed simultaneously.

- 5. Cassettes (ASR units only)
  - A. Recording method: phase-encoding at 800 bpi, 86 character blocks.
  - B. Bit error rate: 1 in 106 (maximum), 1 in 107 (typical).

- C. Storage medium: ANSI-compatible (Phillips-type) cassettes containing 300 feet digital grade magnetic tape. D. Storage: 155,000 characters per track or 310,000 characters per
- cassette (maximum).
- E. Off-line playback or record at 30 characters per second; tape duplication without printing at 250 characters per second. On-line playback or record for Model 732 at 6.67, 10, and 13.33 cps; for Model 733 at 10, 15 and 30 cps.
- F. Transfer Rate: 6400 bits/sec.
- G. Tape Speed: Read/Write 8 in./sec.; rewind time, 60 seconds (maximum).
- H. Sensors: EOT, BOT, cassette in place, write tab, cassette door closed.
- 6. Physical
  - A. Power requrements: 115/230 volts RMS + 10% 15%, 50/60-Hz, 200 VA maximum via a 6 foot 3 wire cable with type "U" grounded 3-prong connector.
  - B. Ambient temperature: Operating, 10°C to 35°C. Storage, -30°C to 70°C, not including paper or magnetic cassettes. Paper, -30°C to 40°C.
  - C. Shock: Operating, 0g. Storage and handling, 10g for 11 msec (in shipping container.)
  - D. Vibration: 10 to 60 cps, 0.5 g.
  - E. Humidity: Operating, equipment only 10% to 90%. Storage, 10% to 95%. (Non-condensing).
  - The solution of the self-contained. Dimensions for KSR units are 21.2" wide x 19.5" deep x 7.2" high. Dimensions for ASR units are 21.2" wide x 19.5" deep x 14.6" high.
  - G. Weight (excluding options): KSR units, 38 lbs maximum. ASR units, 55 lbs. maximum.

		ACE STECHTICAT				
		TERMINAL PINS	MODEM PINS	FUNCTION		
EIA RS-232-C	A. Standard EIA RS-232-C interface cables have 6 ft.	A	1	Protective Ground		
Serial Data	minimum length terminating with a 25-pin male	н	2	Transmitted Data		
Interface	connector.	10	3	Received Data		
		F	4	Request to Send <sup>1</sup>		
		8	5	Clear to Send <sup>2</sup>		
		9	6	Data Set Ready <sup>3</sup>		
		7	7	Signal Ground		
		к	8	Data Carrier Detect <sup>4</sup>		
		6	20	Data Terminal Ready <sup>1</sup>		
		1. Held to EIA ON	I (>+3 V) when termin	al is on line.		
		2. Held to EIA ON	by modem to allow trar	nsmission – required for transmission.		
		3. Held to EIA ON	by modem when moder	n is operative - required for operation.		
		4. Held to EIA ON	by modem during receip	ot of carrier - required for data reception.		
	300 Baud Automatic Answer	E	20	Data Terminal Ready <sup>5</sup>		
	(use with external Modem)	D	22	Ring Indicator <sup>6</sup>		
		5. See above except	signal is switched EIA	ON to answer incoming call and EIA OFF		
		to disconnect.				
		6. Normally EIA OFF, signal comes high with ring of incomming call.				
	1200 Baud	С	4	Request to Send <sup>7</sup>		
		7. Held to EIA ON when terminal is ready to transmit – playback ON or character				
		keyed. Receive mode has priority over transmit mode – terminal may bring RTS				
		signal high after non-receipt of data for at least one character time.				
		TERMINAL PIN	WIRE COLOR	FUNCTION		
300 Baud	A. Nominal operating current is field settable to either	4	White	Positive Receiver Input Loop		
dc-Current	60 ma or 20 ma.	D	Green	Receiver Input Loop		
Loop Serial	B. Less than 5 V (transmit) and 7 V (receive) drop	5	Black	Transmitter Output Loop		
Interface	across contacts while marking.	E	Red	Transmitter Output Loop		
	C. A 6 ft. cable with 4 spade lugs is supplied with this					
	interface option.					
		TERMINAL PIN	WIRE COLOR	FUNCTION		
300 Baud	A. Conforms to Bell Data Access Arrangement CDT.	С	Red	Data Tip (DT)		
Built-In	B. Originate or answer mode available	3	Black	Data Ring (DR)		
Modem	C. A 6 ft. cable with 2 spade lugs is supplied with the			5		
	built-in modem option.					
		TERMINAL PIN	WIRE COLOR	FUNCTION		
300 Baud	A. Conforms to Bell Data Access Arrangement CBS.	7	Black	Signal Ground (SG)		
Automatic	B. Use with Answer mode built-in modem.	E	Red	Off Hook (OH)		
Answer (use	C. A 6 ft. cable with 7 spade lugs is supplied in place	D	Green	Ring Indicator (RI)		
with internal	of manual modem cable above.	5	White	Coupler Cut Through (CCT)		
Modem)		6	Brown	Data Transmission (DA)		
		c	Orange	Data Tip (DT)		
		3	Yellow	Data Ring (DR)		
			1	1		

# DATA INTERFACE SPECIFICATIONS

<ol> <li>Keyboard and Transmission Code</li> <li>2. Data Format</li> </ol>	<ul> <li>MODEL 732: Baudot, 5 level, 7.5 bits per character including one start and one and a half stop bits.</li> <li>The printer character set includes letters and figures – U.S. or letters and figures – UK; selection is a strappable feature. Each has 51 printable characters.</li> <li>MODEL 732: Half- or full-duplex; asynchronous, serial-by-bit, serial-by-character. Within the terminal, eight bits include a 5-bit Baudot character code, an extra bit which is used as a block marker in the ASR unit, and two spare bits.</li> </ul>			<ul> <li>MODEL 733: USASCII, 7-level, 11 bits per character including parity, start, and two stop bits at 10 characters/sec speed; 10 bits per character with one stop bit at higher speeds.</li> <li>A. Standard ASCII keyboard has 68 printable characters and 33 control characters.</li> <li>B. Full ASCII Keyboard has 95 printable characters and 33 control characters. UPPER CASE KEY causes unshifted, alphabetic characters to generate upper case codes.</li> <li>MODEL 733: Half- or full-duplex; asynchronous, serial-by-bit, serial-by-character. Within the terminal, eight bits include a 7-bit ASCII character code plus an extra bit which is used as a block marker in the ASR unit.</li> </ul>			
3. Operator Controls	<ul> <li>A. Terminal</li> <li>B. Printer</li> <li>C. Cassette 1/ Cassette 2</li> <li>D. Record Control</li> </ul>	KSR/ASR Power: On/Off Speed: Lo/Med Hi Transmission Mode: Half/Full Duplex *Parity Select: Odd/Even/ Mark Terminal Status: On-line/Off Print Contrast Line Space: Single/Double	ASR *Speed Status: Lo/Hi (with 1200 Baud option) Baud option) Control: Line/ Off/Local Control: Record/ Playback Tape: Rewind/ Stop and Load- Fast Fwd/Stop Control: Line/ Off/Local and On/Off Tape: Erase/Print Tape Format: Line/Continuous	E. Playback Control F. Keyboard	KSR/ASR REPEAT Key PAPER ADVANCE Key LINE FEED Key HERE IS Key BREAK Key CARRIAGE RETURN Key ** FIGS Key ** FIGS Key TAPE Key TAPE Key	ASR Control: Line/ Off/Local Tape: Continuous Start/Stop, Block Fwd/Rev. and Character Fwd. Control: Line/ Off/Local	
4. Condition Indicators	A. Terminal B. Cassette 1/ Cassette 2 ** Model 733		ASR "READY" light "END" light "RECORD" light "PLAYBACK" light	C. Record Control D. Playback Control	KSR/ASR	ASR "RECORD ON" light CHARACTER Display "PLAYBACK ON" light "PLAYBACK ERROR" light	

# DETAILED SPECIFICATIONS FOR MODELS 732 AND 733

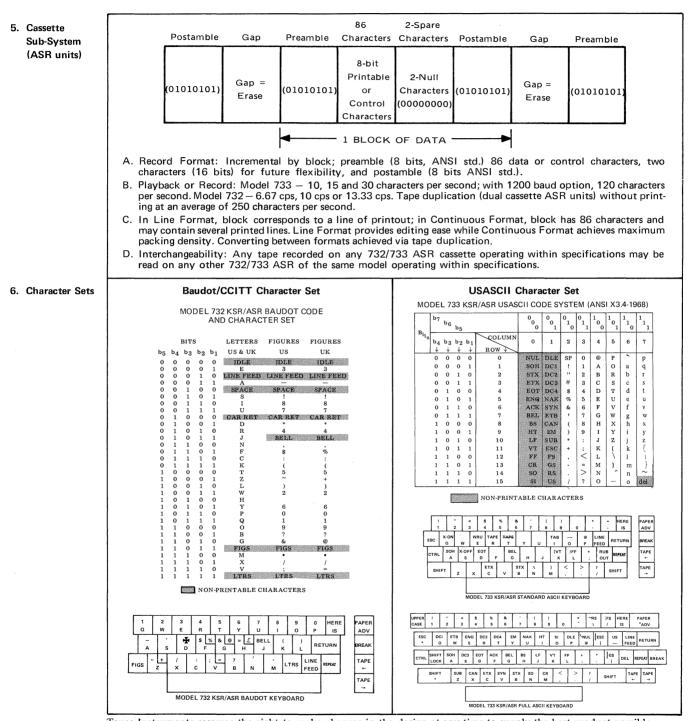
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# SILENT 700

ELECTRONIC DATA TERMINAL

# DETAILED SPECIFICATIONS FOR MODELS 732 AND 733 (Continued)



Texas Instruments reserves the right to make changes in the design at any time to supply the best product possible.

Sales and Service Offices of Texas Instruments are located throughout the United States as well as Canada and major countries overseas. Contact the Digital Systems Division, Texas Instruments Incorporated, P.O. Box 1444, Houston, Texas 77001, or call 713-494-5115, ext. 2126, for the location of the office nearest you.

# TEXAS INSTRUMENTS

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