ASCII & GPIB CODE CHART

B7 B6 B5 BITS / B4 B3 B2 B1	0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
	CONTROL		NUMBERS SYMBOLS		UPPER CASE		LOWER CASE	
0 0 0 0	NUL (0 / 0)	DLE (20 / 10)	SP (40 / 20)	0 (60 / 30)	@ (100 / 40)	P (120 / 50)	` (140 / 60)	p (160 / 70)
0 0 0 1	SOH (1 / 1) GTL	DC1 (21 / 11) LLO	! (41 / 21)	1 (61 / 31)	A (101 / 41)	Q (121 / 51)	a (141 / 61)	q (161 / 71)
0 0 1 0	STX (2 / 2)	DC2 (22 / 12)	" (42 / 22)	2 (62 / 32)	B (102 / 42)	R (122 / 52)	b (142 / 62)	r (162 / 72)
0 0 1 1	ETX (3 / 3)	DC3 (23 / 13)	# (43 / 23)	3 (63 / 33)	C (103 / 43)	S (123 / 53)	c (143 / 63)	s (163 / 73)
0 1 0 0	EOT (4 / 4) SDC	DC4 (24 / 14) DCL	$ (44 / 24)	4 (64 / 34)	D (104 / 44)	T (124 / 54)	d (144 / 64)	t (164 / 74)
0 1 0 1	ENQ (5 / 5) PPC	NAK (25 / 15) PPU	% (45 / 25)	5 (65 / 35)	E (105 / 45)	U (125 / 55)	e (145 / 65)	u (165 / 75)
0 1 1 0	ACK (6 / 6)	SYN (26 / 16)	& (46 / 26)	6 (66 / 36)	F (106 / 46)	V (126 / 56)	f (146 / 66)	v (166 / 76)
0 1 1 1	BEL (7 / 7)	ETB (27 / 17)	' (47 / 27)	7 (67 / 37)	G (107 / 47)	W (127 / 57)	g (147 / 67)	w (167 / 77)
1 0 0 0	BS (10 / 8) GET	CAN (30 / 18) SPE	((50 / 28)	8 (70 / 38)	H (110 / 48)	X (130 / 58)	h (150 / 68)	x (170 / 78)
1 0 0 1	HT (11 / 9) TCT	EM (31 / 19) SPD	) (51 / 29)	9 (71 / 39)	I (111 / 49)	Y (131 / 59)	i (151 / 69)	y (171 / 79)
1 0 1 0	LF (12 / A)	SUB (32 / 1A)	* (52 / 2A)	: (72 / 3A)	J (112 / 4A)	Z (132 / 5A)	j (152 / 6A)	z (172 / 7A)
1 0 1 1	VT (13 / B)	ESC (33 / 1B)	+ (53 / 2B)	; (73 / 3B)	K (113 / 4B)	[(133 / 5B)	k (153 / 6B)	{ (173 / 7B)
1 1 0 0	FF (14 / C)	FS (34 / 1C)	, (54 / 2C)	< (74 / 3C)	L (114 / 4C)	\ (134 / 5C)	l (154 / 6C)	| (174 / 7C)
1 1 0 1	CR (15 / D)	GS (35 / 1D)	− (55 / 2D)	= (75 / 3D)	M (115 / 4D)	] (135 / 5D)	m (155 / 6D)	} (175 / 7D)
1 1 1 0	SO (16 / E)	RS (36 / 1E)	. (56 / 2E)	> (76 / 3E)	N (116 / 4E)	^ (136 / 5E)	n (156 / 6E)	~ (176 / 7E)
1 1 1 1	SI (17 / F)	US (37 / 1F)	/ (57 / 2F)	? (77 / 3F) UNL	O (117 / 4F)	_ (137 / 5F) UNT	o (157 / 6F)	DEL (RUBOUT) (177 / 7F)
	ADDRESSED COMMANDS	UNIVERSAL COMMANDS	LISTEN ADDRESSES		TALK ADDRESSES		SECONDARY ADDRESSES OR COMMANDS (PPE)	(PPD)

KEY

octal	25 PPU	GPIB code
	NAK	ASCII character
hex	15 21	decimal

* ¦ on some keyboards or systems

USER GROUP 42
070-3205-01

TEK REFERENCE GUIDE

7D20 PROGRAMMABLE DIGITIZER

Tektronix®
COMMITTED TO EXCELLENCE

ArtekMedia
Digitally signed by ArtekMedia
DN: cn=ArtekMedia, o=ArtekMedia.com, ou, email=manuals@ArtekMedia.com, c=US
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Introduction

This reference guide is intended to help a user to operate the 7D20. Settings and commands are explained briefly and a page number in the 7D20 Operator's Manual is given for obtaining further information.

Front Panel Settings

Shift Functions 2-92

f: Shift function allows access to functions highlighted in orange. Push '*f*' then function key.

Vertical Amplifier 2-92

VOLTS/DIV: Sets vertical sensitivity in 1,2,5 sequence from 5mV/Div to 5V/Div.

VARIABLE: Continuously variable to at least 12.5 Volts/Div.

COUPLING: AC; Provides AC coupling of input signal.
DC; Provides DC coupling of input signal.
GND; Sets VZR(Vertical Zero Reference) for the digitizer.

INVERT: Inverts signal connected to Channel 2.

POSITION: Adjusts position of trace vertically ± 10 divisions from center graticule.

Time Base Controls 2-96

TIME/DIV: Sets horizontal sweep speed in 1,2,5 sequence from 50ns/Div to 20s/Div and selects EXT CLOCK.

POSITION: Positions waveforms horizontally.

Trigger Controls 2-103

SLOPE: Trigger on positive (when illuminated) or negative slope.

LEVEL: Sets trigger level.

◁ TRIG POS: Adjusts for 0 to 1500 divisions post-trigger.

TRIG POS ▷: Adjusts for 0 to 10 divisions pretrigger.

Trigger Source 2-99

MODE: Trigger source set by Acquire Mode.

CH1: Triggers on Channel 1 input signal.

CH2: Triggers on Channel 2 input signal.

LINE: Triggers on mainframe line frequency.

EXT: Triggers on external trigger input (±1V max).

f, EXT÷10: Triggers on external trigger input with 10X attenuation (±10V max).

Trigger Coupling 2-100

AC: AC couples trigger signal (−3dB at 30Hz nominally.)

LF REJ: AC couples trigger signal (−3dB point at 40kHz nominally.)

HF REJ: Sets high frequency (−3dB point at 40kHz nominally.)

DC: DC couples trigger signal.

Trigger Mode 2-101

P-P: Triggers at a % of peak-to-peak trigger or free runs when no signal present.

AUTO: Triggers on adequate signal level or free runs.

NORM: Sweep is generated only on adequate trigger. Use for repetitive signals below 30 Hz.

HOLD NEXT: Terminates acquisition at end of next waveform acquisition.

Acquire Mode 2-95

CH1→1: Acquires signal from Channel 1 Vertical into Memory 1.

BOTH: Acquires signals from Channel 1 and Channel 2 into Memories 1 and 2 respectively.

ADD: Acquires the sum of Channel 1 and Channel 2 into Memory 1.

CH2→2: Acquires signal from Channel 2 Vertical into Memory 2.

Memory Display 2-105

1-6: Displays contents of Waveform Memories 1-6.

COPY: Copies contents of one memory into another.

EXAMPLE: 'COPY 1-⟩6' places waveform from Memory 1 into Memory 6.

Memory Display (Continued)

CSW: Selects cursor waveform.

EXAMPLE: 'CSW 3' sets Waveform 3 as the Cursor Waveform for modifying and making cursor measurements.

f, REF: When Cursor Waveform is in 'HMAG' or 'VS,' causes unmagnified Y-T display of Cursor Waveform.

Cursor Waveform Controls 2-108

VXPD: Cursor Waveform is expanded to the next more sensitive vertical setting in 1,2,5 sequence.

VCMP: Cursor Waveform is compressed to the next less sensitive vertical setting in 1,2,5 sequence.

HMAG: Causes a ten times horizontal magnification of the Cursor Waveform.

f, HMAG ALL: Causes a ten times horizontal magnification of all stored and displayed waveforms.

VPUP: Positions the Cursor Waveform upward on the CRT display.

VPDN: Positions the Cursor Waveform downward on the CRT display.

VS: Puts 7D20 in X-Y mode with the Cursor Waveform as Y and any other waveform as X.

EXAMPLE: When VS is pressed, 'CSW 1 VS #' is displayed. The user then enters a number from 1 to 6.

Cursor Controls 2-112

◁1: Positions Cursor 1 to the left.

1▷: Positions Cursor 1 to the right.

◁2: Positions Cursor 2 to the left.

2▷: Positions Cursor 2 to the right.

f, △ON: Turns on Cursor 2.

f, △OFF: Turns off Cursor 2.

f, INDEP: Allows each waveform to maintain independent cursor positions.

f, ALIGN: Aligns cursors on all waveforms to the cursor positions on the Cursor Waveform.

Waveform Processing Controls 2-115

SET N: Determines value of 'N' for use with 'AVE' and 'ENV' controls. 'N' is set in powers of 2 from 8 to 256.

AVE: Incoming signal is averaged until terminated by 'HOLD' or 'HOLD NEXT'.

ENV: Continuous envelope of the incoming signal is displayed until terminated by 'HOLD' or 'HOLD NEXT'.

f, AVE N: Averages 'N' waveforms then enters HOLD.

Waveform Processing Controls (Continued)

f, ENV N: Envelopes 'N' waveforms then enters HOLD.

HOLD: Terminates acquisitions immediately.

VECTOR: Turns vectors joining adjacent data points ON or OFF.

Special Functions 2-120

ID: Produces a special GPIB and instrument identification menu which is used to select GPIB system parameters.

RQS: Generates a service request (SRQ).

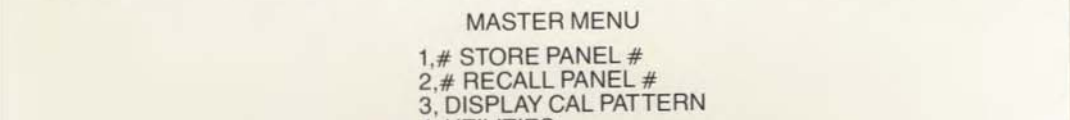
f, RQS #: Generates SRQs with unique event codes. Push RQS# and a number from 1 to 6.

PROBE IDENTIFY: Pushing the probe identify button on a P6053B Probe will generate an SRQ with a unique event code for either Channel 1 or Channel 2.

Menu Driven Functions 2-83

Press the MEMORY DISPLAY buttons to make the menu selections.

MENU: Displays the following menu:



MASTER MENU

1,# STORE PANEL #
2,# RECALL PANEL #
3, DISPLAY CAL PATTERN
4, UTILITIES

1,# STORE PANEL #: Stores the current front panel settings in a user selectable, non-volatile settings memory location (1-6).
2,# RECALL PANEL #: Recalls and immediately implements any one of the front panel settings previously stored using the STORE PANEL function.
3, DISPLAY CAL PATTERN: Displays a calibration pattern on the CRT to allow corrections to the 7D20's display presentation.

Press button 4 to display the following Utilities Submenu:

UTILITIES

1 SEND CSW ASCII
2 SEND CSW BINARY
3 READOUT ON/OFF
4 EXT CLOCK POLARITY
5 INIT FRONT PANEL
6 MASTER MENU

1 SEND CSW ASCII: Sends the Cursor Waveform preamble and data points to another device in LISTEN ONLY mode. 7D20 must be in TALK ONLY mode. Data encoding is ASCII.

Menu-Driven Functions (Continued)

2 SEND CSW BINARY: Same as #1, except that data points encoding is binary.

3 READOUT ON/OFF: Turns text displayed on lines 1,2 and 15,16 on and off. Lines 3-14 are always available to display menus or text.

4 EXT CLOCK POLARITY: Determines which transition (+ or −) of the External Clock will be recognized by the 7D20 when EXT CLOCK is selected.

5 INIT FRONT PANEL: Initializes front-panel settings to the following conditions;

VERTICAL
VOLTS/DIV: 1
COUPLING: AC
CH2 INVERT: OFF

TRIGGERING
MODE: P-P
HOLD NEXT: OFF
COUPLING: AC
SOURCE: MODE
SLOPE: POS
POSITION: 0

HORIZONTAL
TIME/DIV: 1ms
EXT CLOCK POLARITY: POS

MEMORY DISPLAY
DISPLAY 1: ON
DISPLAY 2-6: OFF
CSW: OFF
COPY: OFF
REF: OFF

CURSOR WFM
CSW: 1
VXPD,VCMP,VPUP,VPDN: OFF
HMAG,VS: OFF

ACQUISITION
ACQ MODE: CH1

CURSORS
MODE: ALIGN
△ON: OFF
CURSOR 1: POINT 0
CURSOR 2: POINT 1023

OTHER
AVE,AVEN,ENV,ENVN: OFF
MENU,RQS,RQS #,ID,HOLD: OFF

6 MASTER MENU: Displays the Master Menu

ƒ, TEST: Displays the following Test Menu

TEST MENU

1 EXECUTE SELFTEST
2★CALIBRATION★
3★EXTENDED TEST★
4★CIRCUIT EXERCISER★

★SERVICE ONLY★

All selections (other than item 1, SELFTEST) are for qualified service personnel only.

Warning Messages 2-88

The following warning messages are displayed in the Prompt Field of the CRT:

0-10 TPOS REQD: Displayed when ROLL or EXTernal CLOCK mode entered with a negative trigger position, with AVE or ENV active. Indicates that Posttrigger is unavailable.

HOLD REQD: Displayed if VPUP, VPDN, VCMP or VXPD is pushed while the 7D20 is actively acquiring into the Cursor Waveform. Indicates HOLD mode is required.

HMAG, VS REQD: Displayed if 'REF' is pushed when the 7D20 is not displaying a Magnified Cursor Waveform or is not in VS mode.

CSW REQD: Displayed if the user attempts to turn the Cursor Waveform display off. The CSW is required at all times.

UPDATE IGNORED: Displayed after an attempt to change any of the parameters in the ID Menu when the 7D20 is in the REMOTE-with-lockout state.

RQS OFF: Occurs when the RQS or probe Identify button is pushed and the RQS Mask has been turned off or GPIB Service Requests are disabled.

The following Error Messages are all displayed when there is a failure in the Selftest. The EAROM FAILED message is also given when the RECALL command is executed and the memory called contains invalid data. Refer to qualified service personnel for corrective action.

SELFTEST FAIL
GPIB FAILED
EAROM FAILED

GPIB Functions

Selectable Parameters 4-4

Pushing the 'ID' button displays the following special function menu:

GPIB IDENTIFICATION

ID TEK/7D20,⟨rom⟩.⟨patch⟩

4 SELECT MODE
5 SELECT TERMINATOR
6 SELECT ADDRESS

PRESS ID KEY TO UPDATE AND EXIT
NO UPDATE IN REMOTE ONLY

SELECTABLE MODES: OFF, TALK ONLY, LISTEN ONLY, TALK/LISTEN

SELECTABLE TERMINATORS: EOI, LF/EOI

SELECTABLE ADDRESSES: 0-30

Selections are made by pushing the numbered keys in the MEMORY DISPLAY function group. All selections will be implemented when 'ID' is pressed to exit.

Command Format: 4-11

The 7D20 command format is the following: HEADER/LINK/ARGUMENT. Command names are spelled as printed on the front panel.

The response of the 7D20 to a Help Query (HELP?) is a list of all of the valid command headers:

HELP?

CH1, CH2, TRIGGER,HORIZONTAL,DISPLAY,COPY,CSW,AQR, CURSOR,STORE,RECALL,DT, INIT,TEST,CAL,RQS,CER,EXR,INR, EXW,OPC,USER,PID,WFMPRE,CURVE,DATA,TEXT,DEBUG, RECORDING,LONGFORM

Header, link, and argument names may be abbreviated as long as the abbreviations are unique. The following example shows three identical GPIB commands:

TRIGGER MODE:P-P, COUPLING:ACHFREJ, SLOPE:PLUS

TRIG MODE:P-P, COUP:ACHFREJ, SLOP:PLUS

TR MO:P-,COUP:ACH, SL:PL

Multiple commands may be sent in a single string provided they are separated by a semicolon.

EXAMPLE (Multiple Command string):
TRIG SOURCE:MODE; DISP 1:ON

Command Format (Continued)

Multiple arguments are separated by a comma.

EXAMPLE (Multiple arguments):
TRIG SOURCE:MODE, COUP:AC

Queries

Queries solicit information from the 7D20. They consist of a header followed by a '?' or a header followed by a '?' followed by a label.

EXAMPLE (Header only query):
CH1?
7D20 Response:
CH1 VO:2,POSI:−1,COUP:AC,VA:ON

EXAMPLE (Header and label query):
CH1? VOLTS
7D20 RESPONSE:
CH1 VO:2

Queries may be abbreviated using the same guidelines as for abbreviating commands.

LONGFORM ON | OFF:sets the 7D20 response to queries to either abbreviated or longform.

SRQ's 4-25

STATUS BYTES	DECIMAL	
FATAL ERROR	227	243
POWER ON	65	81
USER REQUEST	67	83
EXECUTION ERROR	98	114
INTERNAL ERROR	99	115
EXECUTION WARNING	101	117
INTERNAL WARNING	102	118
OPERATION COMPLETE	66	82
NO STATUS TO REPORT	0	16

The first column of decimal values are generated without the busy bit set and the second column is with the busy bit set. The 7D20 is considered busy if in process of AVEN, ENVN, or HOLD NEXT.

Event Queries (EVENT? or ERROR?) 4-32

The EVENT QUERY is a means of providing detailed information as to the nature of, or the reason for, the generation of a Service Request (SRQ).

EVENT? Is responded to with an event code defined below.
EVENT ⟨#⟩

ALLEV? Is responded to with a list of all pending event codes.
EVENT ⟨1⟩,⟨2⟩,...

Event Queries (Continued)

EVQTY? is responded to with the number of pending event codes.

EVQTY ⟨#⟩

Defined Event Codes:

CODE	DESCRIPTION
COMMAND ERRORS	
108	Checksum Error in Curve Data
109	Illegal Byte count Error
151	Symbol or Number too long
152	Invalid or Control Character Input
153	Invalid Special Character After Escape
154	Invalid Number Input
155	Invalid String Input
156	Symbol not found
157	Syntax Error
158	Invalid EOI
159	Invalid Delimiter
160	Expression too complex
161	Excessive Binary Curve Points
162	Excessive ASCII Curve Points
EXECUTION ERRORS	
203	I/O Buffers full, Output dumped
250	Not in HOLD mode.
251	Illegal Waveform Number
252	Illegal Settings Memory
253	Illegal Cursor Number
254	Settings RECALL error
255	Display Reference error
256	Turning off CSW display error
257	Illegal Data Memory Number
258	ROLL mode, AVE, ENV, negative TRIGGER POSITION error
259	Waveform Preamble illegal NR.PT
INTERNAL ERRORS	
331	SELFTEST failure Module 1
332	SELFTEST failure Module 2
330+X	SELFTEST failure Module X(X=1−63)
394	SELFTEST complete and it failed

SYSTEM EVENTS

401 Power ON
403 User Request (RQS KEY)
450 HOLD after AVEN, ENVEN, or HOLD NEXT
451 RQS 1
452 RQS 2
453 RQS 3
454 RQS 4
455 RQS 5
456 RQS 6
457 RQS 7(CH1 Probe Identify)
458 RQS 8(CH2 Probe Identify)
459 SRQ pending
460 SELF TEST COMPLETED and PASSED

EXECUTION WARNING

550 VOLTS/DIV out of range
551 VERTICAL POSITION out of range
552 TRIGGER LEVEL out of range
553 TRIGGER POSITION out of range
554 HORIZONTAL TIME/DIV out of range
555 VXPD out of range
556 CSW POSITION out of range
557 SET N value out of range

558 CURSOR POSITION out of range
559 ASCII point out of range
560 WFMPRE XINCR out of range
561 WFMPRE PT.OFF out of range
562 WFMPRE YMULT out of range
563 WFMPRE YZERO out of range

Debugging 4-76

DEBUG ON: Commands sent to the 7D20 will appear in the text field of the CRT as ASCII characters until an EOI is encountered. When an error is encountered, the word 'ERROR' will appear along with the event code which describes the error.

Recording 4-76

RECORDING ON: When the 7D20 is in ROLL mode, at the end of each acquisition the waveform will be transferred to a temporary holding buffer and an Operation Complete SRQ will be asserted. This allows the user to continuously acquire waveforms by sending a CURVE Query after Operation Complete SRQ.

Waveform Transfers

Waveform data consists of a Preamble containing encoding and setup information, followed by Curve Information containing actual data points.

FORMAT: ⟨preamble⟩⟨separator⟩⟨curve⟩⟨terminator⟩

TERMINATOR	SEPARATOR
⟨eoi⟩	⟨;⟩
⟨cr lf/eoi⟩	⟨;⟩

DATA ENCODING: May be ASCII or BINARY and is set with the following commands:
4-24 DATA ENCDG:ASC or DATA ENCDG:BIN

DATA INTERPOLATE: Sets 820 to 1024 point interpolation mode for all extended realtime waveforms transmitted from the 7D20.

EXAMPLE: DATA INTERPOLATE:ON

DATA MEMORY: Sets the memory destination and source for all waveform transmissions.
4-24

EXAMPLE DATA MEM:1:
1 = Waveform Register Number(1-6)

WFMPRE?: Responds with the current source waveform's preamble.
4-20:

If ASCII:
WFMPRE WFID:⟨wfmid⟩,ENCDG:ASC,
NR.PT:⟨p/w⟩,PT.FMT:Y,XINCR:⟨x increment⟩,
PT.OFF:⟨point #⟩,XZERO:0, XUNIT: ⟨x unit⟩,YMULT:⟨y multiplier⟩,YZERO:⟨y zero⟩,YUNIT:⟨y unit⟩

If BINARY:
WFMPRE WFID:⟨wfmid⟩,ENCDG:BIN,
NR.PT:⟨p/w⟩,PT.FMT:Y,XINCR:⟨x increment⟩,
PT.OFF:⟨point #⟩,XZERO:0,XUNIT:⟨x unit⟩,YMULT:⟨y multiplier⟩,YZERO:⟨y zero⟩,YUNIT:⟨y unit⟩,BYT/NR:1,
BN.FMT:LF,BIT/NR:8,CRVCHK:CHKSMO

Where:
⟨wfmid⟩ = W(Waveform #) or W(Waveform #)I
'I' indicates interpolated data.
⟨p/w⟩ = Points per waveform
⟨x increment⟩ = Time between points
⟨point #⟩ = Trigger point
⟨y multiplier⟩ = Vertical scale factor

Waveform Transfers (Continued)

⟨y zero⟩ = −(VZR x Vertical Scale Factor)
⟨y unit⟩ ::= Displayed vertical scale factor unit.
⟨x unit⟩ ::= Displayed horizontal scale factor unit.

CURVE?: Responds with the current Source WFM's CURVE data.

4-23 Format:

If ASCII:
CURVE ⟨ascii point⟩,...

⟨ascii point⟩ = −5.12 to +5.08 divisions from center screen.

If BINARY:
CURVE %⟨binary count⟩
⟨binary point⟩...⟨checksum⟩

⟨binary count⟩ = A 2-byte representation of the number of binary points plus one for the checksum byte.

⟨binary point⟩ = 8-bit byte,integer binary from 0 at screen bottom to 255 at the top of screen.

⟨checksum⟩ = 2's complement of the modulo 256 sum of the preceding binary data bytes and the binary count

WAVFRM?: Responds with the current source waveforms preamble and
4-24 curve data.

Text Handling 4-17

TEXT: Causes the 7D20 to display text in the center 12 lines of the CRT.

EXAMPLE: PRINT @A: "TEXT" "TEST 51""
causes 'TEST 51' to be printed on the 7D20 host CRT.

SPECIAL CHARACTERS: The 7D20 accepts the following special characters:

↓(Down Arrow)=:ESC a
△(Delta)=:ESC d
m(Milli)=:ESC m
μ(Micro)=:ESC u
p(Pico)=:ESC p
n(Nano)=:ESC n
→(Right Arrow)=:ESC r
↑(Up Arrow)=:↑
TAB(5 Spaces)=:ASC CODE 09 (HEX)

TEXT?: Responds with the center 12 lines of display text(lines 3-14).

RDOUT?: Responds with the four lines of readout from the CRT display(lines 1,2,15 and 16).

ID? and SET? Queries 4-75

ID?: Responds with the 7D20's ID;

ID TEK/7D20,⟨rom⟩.⟨patch⟩

SET?: Responds with a string containing all of the front-panel settings and is the same as sending all of the following queries:

CH1?;CH2?;HORIZ?;AQR?;CSW?;

DISP?;TRIG?;CURS?

Device Trigger 4-62

DT OFF: Disables 7D20 to a Group Execute Trigger

DT HOLD | HOLDN | AVE | AVEN | ENV | ENVN

NORMAL: Deferred command is executed on GET Interface Message. Only one deferred command may be triggered from each GET. Previous pending deferred commands are cleared without execution

DT?: Responds with the deferred command to be executed on the next GET Interface message.

Initialization 4-63

INIT: Causes full initialization of settings, waveform memories, and GPIB functions.

INIT PANEL: Initializes front-panel settings to value described in the Utilities Menu section.

INIT WAVFRM: Sets all data points to zero in waveform memories 1-6 and sets VPUP, VPDN, VXPD, VCMP, HMAG, VS and REF to an OFF condition.

INIT GPIB: Turns On EXR, INR, SYS, EXW, OPC, USER, RQS, CER, DATA ENCODING BINARY, LONGFORM

Turns Off PID, DT, DEBUG, INTERPOLATE, RECORDING

7D20 Command Set

CHANNEL 1 GROUP 4-39

CH1 VOlts:⟨5 E-3 to 5⟩
CH1? VOlts
CH1 POSItion:⟨−10.24 to +10.22⟩
CH1? POSItion
CH1 COUPling:AC|GNd|DC
CH1? COUPling
CH1 VAriable:ON|OFf
CH1? VAriable
CH1?PRobe
CH1?

CHANNEL 2 GROUP 4-42

CH2 VOlts:⟨5 E-3 to 5⟩
CH2? VOlts
CH2 POSItion:⟨−10.24 to +10.22⟩
CH2? POSItion
CH2 COUPling:AC|GNd|DC
CH2? COUPling
CH2 VAriable:ON|OFf
CH2? VAriable
CH2 INVert:ON|OFf

CH2? INVert
CH2?PRobe
CH2?

TRIGGERING GROUP 4-45

TRigger MOde:P-p|AUto|NOrmal
TRigger? MOde
TRigger HOLDN:ON|OFf
TRigger? HOLDNext
TRigger COUPling: AC|ACLfrej|DCHfrej|DC|ACHfrej
TRigger? COUPling
TRigger SOurce:MOde|CH1 |CH2|LIne|EXT |EXT/10
TRigger? SOurce
TRigger SLope:PLus|MInus
TRigger? SLope
TRigger LEvel:⟨−6.4 to +6.35⟩
TRigger? LEvel
TRigger POSItion:⟨−1500 to +10⟩
TRigger? POSItion
TRigger?

TIME/DIVISION GROUP 4-48

HORizontal TIme:⟨5 E-9 to 20⟩
HORizontal? TIme

TIME/DIVISION GROUP (Continued)

HORizontal POSItion:ON|OFf
HORizontal? POSItion
HORizontal CLock: INTernal|EXTP|EXTN
HORizontal? CLock
HORizontal?

DISPLAY GROUP 4-50

DIsplay 1:ON|OFf
DIsplay? 1
DIsplay 2:ON|OFf
DIsplay? 2
DIsplay 3:ON|OFf
DIsplay? 3
DIsplay 4:ON|OFf
DIsplay? 4
DIsplay 5:ON|OFf
DIsplay? 5
DIsplay 6:ON|OFf
DIsplay? 6
DIsplay CSw:⟨1 to 6⟩
DIsplay? CSw
DIsplay VEctor:ON|OFf
DIsplay? VEctor

DIsplay REFerence:ON|OFf
DIsplay? REFerence
DIsplay RDout:ON|OFf
DIsplay? RDout
DIsplay?
COPy 1:⟨1 to 6⟩
COPy 2:⟨1 to 6⟩
COPy 3:⟨1 to 6⟩
COPy 4:⟨1 to 6⟩
COPy 5:⟨1 to 6⟩
COPy 6:⟨1 to 6⟩

CURSOR WAVEFORM GROUP 4-53

CSw? VOlts
CSw VXpd:⟨−2 to +2⟩
CSw? VXpd
CSw POSItion:⟨−5.12 to +5.08⟩
CSw? POSItion
CSw HMag:ON|OFf|ALLON|ALLOFF
CSw? HMag
CSw VS:⟨1 to 6⟩
CSw? VS
CSw?

ACQUISITION GROUP 4-56

AQr MOde:CH1 | BOth | ADd | CH2
AQr? MOde
AQr HOLD:ON | OFf
AQr? HOLD
AQr SEt:8 | 16 | 32 | 64 | 128 | 256
AQr? SEt
AQr TYpe:NOrmal | AVE | AVEN | ENV | ENVN
AQr? TYpe
AQr?
RECOrding ON | OFf

CURSOR GROUP 4-59

CURSor MOde:INDep | ALign
CURSor? MOde
CURSor DELta:ON | OFf
CURSor?DELta
CURSor 1:⟨0 to 1023⟩
CURSor? 1
CURSor 2:⟨0 to 1023⟩
CURSor? 2
CURSor?
COOrd? VCrd
COOrd? HCrd
COOrd?

FRONT PANEL SETTINGS GROUP 4-61

STOre ⟨set number⟩
RECall ⟨set number⟩

DEVICE TRIGGERING 4-62

DT OFf | HOLD | HOLDN | AVE | AVEN | ENV | ENVN | NOrmal
DT?

INITIALIZATION 4-63

INIt
INIt PAnel
INIt WAveform
INIt GPib

SELFTEST GROUP 4-64

TESt
TESt CONtinue
TESt EXIt

CALIBRATION GROUP 4-65

CAI DIsplay
CAI DDac
CAI POSOff
CAI POSGain

CALIBRATION GROUP (Continued)

CALRAmp
CALOFf
CAl?
RAmp?

SERVICE REQUEST GROUP 4-66

RQs ON|OFf
RQs?
CEr ON|OFf
CEr?
EXR ON|OFf
EXR?
INR ON|OFf
INR?
EXW ON|OFf
OPc ON|OFf
OPc?
User ON|OFf
User?
PId ON|OFf

PID?
SRQ?

WAVEFORM PREAMBLE GROUP 4-68

WFMpre? WFId
WFMpre ENCdg:ASCii|BINary
WFMpre? ENCdg
WFMpre NR.pt:820|1024
WFMpre? NR.pt
WFMpre? PT.Fmt
WFMpre Xincr:⟨x increment⟩
WFMpre? Xincr
WFMpre PT.OFF:⟨point number⟩
WFMpre? PT.OFF
WFMpre? XZero
WFMpre XUnit:⟨horiz scale factor⟩
WFMpre? XUnit
WFMpre YMult:⟨vertical scale factor⟩
WFMpre?YMult
WFMpre YZero:⟨vertical zero⟩
WFMpre? YZero
WFMpre YUnit:⟨vertical units⟩
WFMpre? YUnit

WAVEFORM PREAMBLE GROUP (Continued)

WFMpre? BYt/nr
WFMpre? BN.fmt
WFMpre? BIT/nr
WFMpre? CRVChk
WFMpre?

WAVEFORM CURVE GROUP 4-72

CURVe ⟨ascii curve⟩ | ⟨binary curve⟩
CURVe?

WAVEFORM PREAMBLE AND CURVE GROUP 4-73

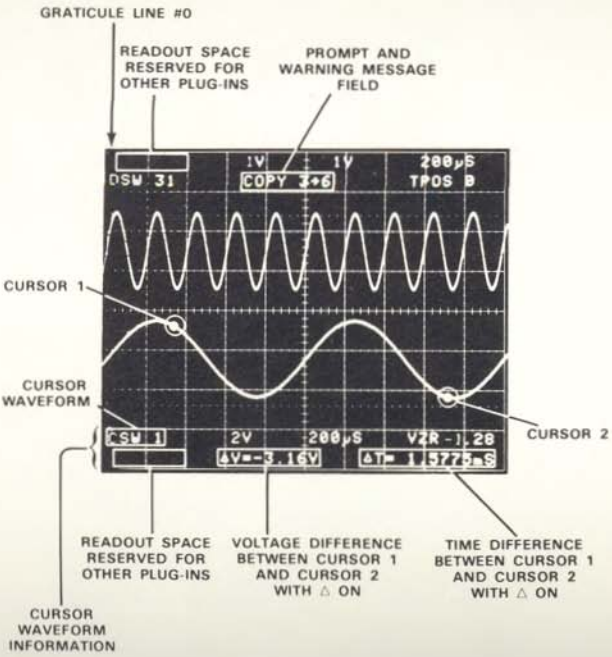
WAvfrm?
DATa ENCdg:ASCii | BINary
DATa? ENCdg
DATa INTErpolate:ON | OFf
DATa? INTErpolate
DATa MEmory:⟨1 to 6⟩
DATa? MEmory

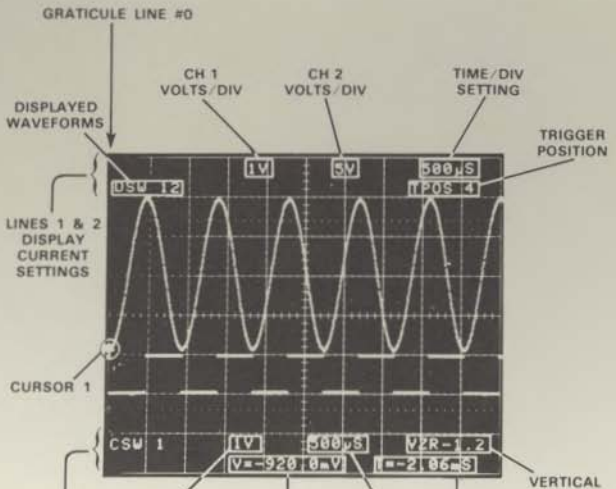
READOUT AND TEXT COMMANDS 4-74

TEXt "text"
TEXt?
RDout?

PROGRAMMING AIDS 4-75

ID?
SEt?
HELp?
DEBug ON | OFf
DEBug?
LOngform ON | OFf
LOngform?


GRATICULE LINE #0
READOUT SPACE RESERVED FOR OTHER PLUG-INS
PROMPT AND WARNING MESSAGE FIELD
1V 1V 200µS
DSW 31
COPY 3+6
TPOS 0
CURSOR 1
CURSOR WAVEFORM
CURSOR 2
CSW 1 2V 200µS VZR -1.28
ΔV=-3.16V ΔT= 1.5775mS
READOUT SPACE RESERVED FOR OTHER PLUG-INS
VOLTAGE DIFFERENCE BETWEEN CURSOR 1 AND CURSOR 2 WITH Δ ON
TIME DIFFERENCE BETWEEN CURSOR 1 AND CURSOR 2 WITH Δ ON
CURSOR WAVEFORM INFORMATION


GRATICULE LINE #0
CH 1 VOLTS/DIV
CH 2 VOLTS/DIV
TIME/DIV SETTING
DISPLAYED WAVEFORMS
TRIGGER POSITION
1V 5V 500µS
DSW 12
TPOS 4
LINES 1 & 2 DISPLAY CURRENT SETTINGS
CURSOR 1
CSW 1 1V 500µS VZR -1.2
V=-920.0mV T=-2.06mS
VERTICAL ZERO REFERENCE OF CSW
VOLTS/DIV OF CSW
TIME/DIV OF CSW
CURSOR TIME POSITION FROM TRIGGER POINT WITH Δ OFF
CURSOR VOLTAGE POSITION FROM VZR WITH Δ OFF
CURSOR WAVEFORM INFORMATION

ASCII & GPIB CODE CHART

B7 B6 B5 / BITS / B4 B3 B2 B1	0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
	CONTROL		NUMBERS SYMBOLS		UPPER CASE		LOWER CASE	
0 0 0 0	0 NUL 0 0	20 DLE 10 16	40 SP 20 32	60 0 30 48	100 @ 40 64	120 P 50 80	140 ` 60 96	160 p 70 112
0 0 0 1	1 GTL SOH 1 1	21 LLO DC1 11 17	41 ! 21 33	61 1 31 49	101 A 41 65	121 Q 51 81	141 a 61 97	161 q 71 113
0 0 1 0	2 STX 2 2	22 DC2 12 18	42 " 22 34	62 2 32 50	102 B 42 66	122 R 52 82	142 b 62 98	162 r 72 114
0 0 1 1	3 ETX 3 3	23 DC3 13 19	43 # 23 35	63 3 33 51	103 C 43 67	123 S 53 83	143 c 63 99	163 s 73 115
0 1 0 0	4 SDC EOT 4 4	24 DCL DC4 14 20	44 $ 24 36	64 4 34 52	104 D 44 68	124 T 54 84	144 d 64 100	164 t 74 116
0 1 0 1	5 PPC ENQ 5 5	25 PPU NAK 15 21	45 % 25 37	65 5 35 53	105 E 45 69	125 U 55 85	145 e 65 101	165 u 75 117
0 1 1 0	6 ACK 6 6	26 SYN 16 22	46 & 26 38	66 6 36 54	106 F 46 70	126 V 56 86	146 f 66 102	166 v 76 118
0 1 1 1	7 BEL 7 7	27 ETB 17 23	47 ' 27 39	67 7 37 55	107 G 47 71	127 W 57 87	147 g 67 103	167 w 77 119
1 0 0 0	10 GET BS 8 8	30 SPE CAN 18 24	50 (28 40	70 8 38 56	110 H 48 72	130 X 58 88	150 h 68 104	170 x 78 120
1 0 0 1	11 TCT HT 9 9	31 SPD EM 19 25	51) 29 41	71 9 39 57	111 I 49 73	131 Y 59 89	151 i 69 105	171 y 79 121
1 0 1 0	12 LF A 10	32 SUB 1A 26	52 * 2A 42	72 : 3A 58	112 J 4A 74	132 Z 5A 90	152 j 6A 106	172 z 7A 122
1 0 1 1	13 VT B 11	33 ESC 1B 27	53 + 2B 43	73 ; 3B 59	113 K 4B 75	133 [5B 91	153 k 6B 107	173 { 7B 123
1 1 0 0	14 FF C 12	34 FS 1C 28	54 , 2C 44	74 < 3C 60	114 L 4C 76	134 \ 5C 92	154 l 6C 108	174 | 7C 124
1 1 0 1	15 CR D 13	35 GS 1D 29	55 - 2D 45	75 = 3D 61	115 M 4D 77	135] 5D 93	155 m 6D 109	175 } 7D 125
1 1 1 0	16 SO E 14	36 RS 1E 30	56 . 2E 46	76 > 3E 62	116 N 4E 78	136 ^ 5E 94	156 n 6E 110	176 ~ 7E 126
1 1 1 1	17 SI F 15	37 US 1F 31	57 / 2F 47	77 UNL ? 3F 63	117 O 4F 79	137 UNT _ 5F 95	157 o 6F 111	177 DEL (RUBOUT) 7F 127
	ADDRESSED COMMANDS	UNIVERSAL COMMANDS	LISTEN ADDRESSES		TALK ADDRESSES		SECONDARY ADDRESSES OR COMMANDS (PPE) (PPD)	

KEY

octal 25 PPU — GPIB code
NAK — ASCII character
hex 15 21 — decimal

* ! on some keyboards or systems

TEK REFERENCE GUIDE

USER GROUP 42
070-3205-01

7D20 PROGRAMMABLE DIGITIZER

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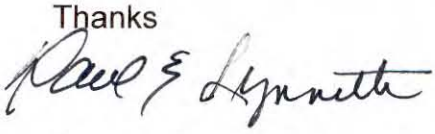

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