HP 3478A
Quick Reference Card

The 3478A command set consists of several commands. Each command performs a function.

Commands

[] means optional parameter
<> means mandatory parameter

C	Calibrate (see Service Manual)
D<1 or 2[message] or 3[message]>	Display mode 1 = normal 2 = display the message on the LCD 3 = like 2, stops updating the LCD
E	Error register
F<1 to 7>	Function (see table on back) F1 = DCV F2 = ACV F3 = 2 Wire Ohms F4 = 4 Wire Ohms F5 = DC Amps F6 = AC Amps F7 = Extended Ohms
K	Clear the serial poll register.
M<hl>	Set the lower 6 bits of the SRQ Mask to octal value. 'h' Sets bits 3-5 and 'l' sets bits 0-2 of the mask (see "B" command)
N<3, 4, or 5>	Number of digits of resolution N3 = 3-½, N4 = 4-½, N5 = 5-½

R<1 to 6> **RA**	Range (see table on back) RA = Autorange
T<1 to 5>	Trigger T1 = Internal trigger T2 = External trigger T3 = Single trigger T4 = Trigger hold T5 = Fast trigger
Z<0 or 1>	Voltmeter Autozero Z0 = Autozero OFF, Z1 = Autozero ON.
B	Initiate binary status output. Addressed as a Talker immediately after receiving the B command the 3478A outputs 5 bytes. Also clears the error register.
	Byte 1: Function, Range Bits 7,6,5: Function 1 (001) = DC Volts 2 (010) = AC Volts 3 (011) = 2-Wire Ohms 4 (100) = 4-Wire Ohms 5 (101) = DC Amps 6 (110) = AC Amps 7 (111) = Extended Ohms Bits 4,3,2: Range 1 (001) = Range R1 2 (010) = Range R2 3 (011) = Range R3 4 (100) = Range R4 5 (101) = Range R5 6 (110) = Range R6 Bits 1,0: Display 0 (00) = invalid 1 (01) = 5 ½ digits 2 (10) = 4 ½ digits 3 (11) = 3 ½ digits
	Byte 2: Status Bits 7 0 = always: not used Bit 6 1 = external trigger selected Bit 5 1 = Cal RAM enabled Bit 4 1 = Front/Rear switch in Front pos. Bit 3

	0 = line freq. 60 Hz 1 = line freq. 50 Hz Bit 2 0 = Autozero = OFF 1 = Autozero = ON Bit 1 0 = Autorange = OFF 1 = Autorange = ON Bit 0 0 = single trigger 1 = internal trigger
	Byte 3: SRQ Mask Bit 7 1 = SRQ on power-on or Test/Reset by rear SW 3. Bit 6 0 = always, not used Bit 5 1 = SRQ on calibration failure Bit 4 1 = SRQ on SRQ key Bit 3 1 = SRQ on hardware error Bit 2 1 = SRQ on syntax error Bit 1 0 = always, not used Bit 0 1 = SRQ on each reading
	Byte 4: Error Info Bit 7,6 0 = always: not used Bit 5 1 = failure in A/D link Bit 4 1 = A/D has failed self-test Bit 3 1 = A/D error Bit 2 1 = ROM error Bit 1 1 = RAM error Bit 0 1 = calibration error
	Byte 5: DAC Value The setting of the internal D/A converter, a value between 0 and 63. Only useful for system debugging.

Range Codes

Function	Code	R-2	R-1	R0	R1	R2	R3	R4	R5	R6	R7	RA (Auto Range)
DC Volts	F1	30mV	300mV	3V	30V	300V	*	*	*	*	*	
AC Volts	F2	*	300mV	3V	30V	300V	*	*	*	*	*	Auto Range
Two Wire Ω	F3	*	*	*	30Ω	300Ω	3kΩ	30kΩ	300kΩ	3MΩ	30MΩ	
Four Wire Ω	F4	*	*	*	30Ω	300Ω	3kΩ	30kΩ	300kΩ	3MΩ	30MΩ	
DC Amps	F5	*	300mA	3A	3A	*	*	*	*	*	*	
AC Amps	F6	*	300mA	3A	3A	*	*	*	*	*	*	
Ext. Ohms	F7	*	*		*	*	*	*	*	*	*	

* indicates an invalid combination of function and range.

Examples

Spaces in command strings are optional.

The examples make use of the I/O ROM.

Example 1: Perform a measurement (HP 85):

```
REMOTE 923
OUTPUT 923 ; "F1 RA Z1 N4 T2"
ENTER ; A$
```
- F1 = DC Volts
- RA = auto range, starting from current range
- Z1 = Autozero on
- N4 = 4-½ digits
- T2 = perform single trigger now

Example 2 Read status (HP 85):

```
10 REMOTE 923
20 OUTPUT 923 ; "B"
30 ENTER USING "5(1B) " ; B1,B2,B3,B4,B5
```
- B = Prepare to send status

Example 3a: Use front panel SRQ key (HP 85)

```
10 REMOTE 901
20 OUTPUT 901 ; "M20"
30 ON ONTR 9 GOSUB 80
40 ENABLE INTR 9
50 GOTO 50 ! do something else
60 END
70 ! --- interrupt service routine ---
80 P=SPOLL(901)
90 IF BIT(P,4) THEN DISP "SRQ Pressed."
100 RETURN
```
- M20 = set SRQ mask to 010.000 (SRQ key)

Example 3b: Use front panel SRQ key (HP 85)

```
10 OUTPUT 723; "M20"
20 ON INTR 7 GOSUB 70
30 ENABLE INTR 7;8 ! SRQ
40 SEND 7 ; MTA LISTEN 23 DATA "F1"
50 GOTO 50 ° --- wait
60 ! ISR
70 DISP "SRQ"
80 STATUS 7,1 ; A  ! clear SRQ bit
90 P=SPOLL(723) ! get status
100 ENTER 723 ; U
110 DISP U
120 ENABLE INTR 7;8 ! re-enable SRQ
130 RETURN
140 END
```
- Each SRQ press causes a reading to be performed and displayed.

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