3458A-12C

S E R V I C E   N O T E

3458A – DIGITAL MULTIMETER

Serial Numbers: ALL

Outguard Firmware Upgrade: Enhancements, Fixes, & Changes (Rev. 9)

Parts Required:

P/N	Description	Qty.
03458-80023	Updates 03458-66505 Revision A	1 (set of 6 ROMS; U110-U115)
03458-80023	Updates 03458-66515 Revision A	1(set of 6 ROMS; U110-U115)
03458-88897	Updates 03458-66505 Revision B	1 (single ROM; U110)
03458-88897	Updates 03458-66515 Revision B	1 (single ROM; U110)
03458-88897	Updates 03458-66505 Revision C	1 (single ROM; U110)
03458-88897	Updates 03458-66515 Revision C	1 (single ROM; U110)

ADMINISTRATIVE INFORMATION

SERVICE NOTE CLASSIFICATION:	
MODIFICATION AVAILABLE	
ACTION CATEGORY:: AGREEABLE TIME	X PERFORMANCE ENHANCEMENT [[]] SERVICE / RELIABILITY ENHANCEMENT
LOCATION CATEGORY: X CUSTOMER INSTALLABLE [[]] ON-SITE X SERVICE CENTER [[]] CHANNEL PARTNERS	AVAILABILITY: End of Support
AUTHOR: LH	PRODUCT LINE: SP
ADDITIONAL INFORMATION:	

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Agilent Technologies

Situation:
The firmware in the 3458A has been upgraded several times with Revision 9,X containing all fixes, enhancements and changes. There is little reason to upgrade if the changes to the firmware affect instrument capability that is not utilized in the customer application.

The firmware revision can be determined by using the "REV?" command available in the menu from the front panel. Once the firmware revision has been determined, then the improvements listed for all later revisions identify the improvements that will be realized by upgrading to Revision 8,X. Workarounds are listed that may provide alternatives to an upgrade.

Revision 8,X
Issue before improvement: The PERiod measurements could be out of specification. The accuracy of this function is dependent on the 3458A internal reference frequency (crystal clock) and a small digital correction to compensate for the crystal frequency deviations from 10 MHz. The digital correction was being applied incorrectly which means that as the crystal frequency changes with time the period measurements may become marginal with respect to the instrument specification.

Work-around: Customers can use the frequency measurement capability and determine period by computing the inverse.

Revision 7,X
Issue before improvement: When operating the 3458A using a 50Hz line a RESET command sets the instrument into a 60 Hz mode. The measurements will be accurate but the reading will be more subject to 50 Hz noise (the instrument is set to reject 60Hz noise in a 50Hz environment). (Note: The correct line frequency is stored properly at power-on)

Work-around: Send LFREQ 5O after the RESET command to set the instrument for a 50 Hz environment. (Note: the command "LFREQ LINE" could also be used)
Issue before improvement: When in the Ohms function with autorange enabled the EXTOUT signal stops being outputted when autoranging reaches the 1 megohm range.

Work-around: Do not use autoranging when using both the Ohms function and the EXTOUT signal.
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Issue before improvement: Sending the command sequence "ACV; RESET; TARM HOLD" leaves the display showing ACV instead of DCV.

Work-around: Send "DISP CLR" after the "RESET" command to make the display correct.
Issue before improvement: Errors occur when "TEST" and "ACAL ALL" commands are combined with OHM commands and executed with open input terminals. Examples are:
Command sequence "RESET; OHMF 10; ACAL ALL"; the resulting error is "HARDWARE FAILURE – unable to read a/d"
Command sequence "RESET; OHMF 10; TEST"; the resulting error is "HARDWARE FAILURE – slave test: OVERLOAD"
Command sequence "RESET; OHM 10; TEST"; the resulting error is "HARDWARE FAILURE – test value out of range: 106"

Work-around: Select DCV before doing ACAL.

Revision 6,X
Enhancements: Code changes to move ACV adjustment closer to "nominal".
Issue before improvement: Going from DCV to a low-level ACV (10 mV range or 100 mV range)
with a large dc voltage (> 100 V) applied to the front terminals will sometimes cause the 3458A to
stop triggering.

Work-around: Send a Device Clear and then send a trigger command to re-start triggering, or remove
the high voltage from the input terminal before going into the ACV function.
Issue before improvement: Sending commands such as ACV 1.3, <resolution> to select the 10V range
with SETACV SYNC enabled causes excessive reading noise because too few digital samples are
taken to meet the <resolution> parameter specified.
In similar fashion sending "DCV 1.3, <resolution> to select the 10 V range" or "OHM 1300,
<resolution> to select the 10 KOHM range" will select the wrong A/D aperture to guarantee that the
<resolution> parameter is satisfied. Insufficient measurement resolution will result.

Work-around: Use the following commands to avoid the problems described above: "ACV 10,
<resolution> to select the 10V range with SETACV SYNC enabled"; "DCV 10, <resolution> to select
the 10 V range"; and "OHM 1000, <resolution> to select the 10 KOhm range".
Issue before improvement: Removing readings slowly from memory using the "implied read"
mechanism will leave the last reading output in memory if the 3458A is configured to receive highspeed
bursts into memory. A subsequent "MCOUNT?" query will return "1" instead of the correct
value of "0".

Work-around: Executing "MEM FIFO" (or LIFO) will flush any undesired reading from memory.
The "RMEM" command could be used to retrieve the readings from memory and avoid this issue.
Issue before improvement: With the situation described in the above issue the GPIB may stop
communicating when outputting the last value.

Work-around: Use the "RMEM" command to retrieve the readings from memory and avoid this issue.
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Issue before improvement: The 3458A stops triggering under the following conditions: DCV <manual
range>; RATIO ON; NPLC > 10.

Work-around: Don't use manual range, or use a NPLC <= 10
Issue before improvement: The TIMER is set to some value. A loop is started where a "DELAY
<xx>" is followed by "TIMER?". Each time around the loop the "TIMER?" command will return a
value that is always decremented by 100ns.

Work-around: None
Issue before improvement: Only one reading will be taken by the 3458A when triggered under the
following conditions: instrument set to measure Ohms, autorange is on, ocomp is on, the delay set to >
0.65, and nrdgs set to > 1.

Work-around: Use a shorter delay, or turn autorange off, or turn ocomp off.

Revision 5,X
Enhancement: Added a command called RMATHV that allows doing RMATH into a BASIC variable.
Issues before improvement: (there are no known work-arounds for these issues)
EOI doesn't work with RMEM.
False self-test failure at elevated temperatures.
If stats is on and readings are quiet (a few counts of noise in the 8th digit) then computing the standard
deviation may not be correct.
DCV measurements on the 10 V range were shifted by 0.13 uV (within specifications but slightly
biased).
Response to query for the Cal constants 178 –189 shows incorrect description: constants 178-183 are

'acdc offset dac' values (indicated as 'ac offset dac'); contants 184-189 are 'ac offset dac' values (indicated as 'acdc offset dac). Note: This issue does not cause incorrect reading to be made.
Issue before improvement: CALSTR? hangs the GPIB.

Work-around: Turn INBUF ON when sending CALSTR? If it is desirable to have INBUF OFF then suppress CR/LF and send CALSTR?.
Issue before improvement: A "TRIGGER TOO FAST" error occurs on the second reading with NRDGS <n>,TIMER, NPLC > 10

Work-around: Turn ARANGE OFF or use NPLC <= 10.
Issue before improvement: Incorrect acv reading or overload indication occurs when sending the following sequence of commands: RESET then SETACV SYNC then ACV .01 (note: the problem occurs because the ac-coupled offset dac value is loaded instead of the dc-coupled offset dac).

Work-around: After setting the desired range doing an up-range followed by a down-range will prevent this problem.
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Issue before improvement: Sending the command sequence "OHM 1E4;OCOMP ON;DISP OFF; TRIG SGL" returns the incorrect value "1E38" when measuring values < 10 KOHMS.

Work-around: Send "DISP OFF" as the first command in the sequence.
Issue before improvement: Sending "AZERO ONCE" does not always cause the 3458A to immediately make the autozero measurement.

Work-around: After sending the "AZERO ONCE" COMMAND force the 3458A to take a measurement (e.g., using TRIG SGL) and then discard this "unwanted reading".

Revision 4,X
Issues before improvement: (there are no known work-arounds for these issues)
A error message "SLAVE TEST: Gate Array self test failure" results from the following command sequence "RESET;MFORMAT SINT;MEM FIFO;TEST".
A reading "OV.LD GOHM" results when the following command is sent with open terminals (likely occurs with resistors across the terminal with values > 100 KOHMS) "RESET;OCOMP ON;AZERO OFF;OHM 10E6".
The reading returned by the command CAL? –5 is always 10 counts low.
If INBUF is ON and a reading or query is partially removed from the output buffer, a byte will be left in an internal buffer in the 3458A. If another query is then executed, followed by a quick ENTER from the controller, this "stray byte" will be transmitted first, followed by the query response.
Normal overload indication is "1E+38". Overload indication for FREQ or PER (frequency or period) measurements is "9.999932291E+37".
Issue improved with this version of code: When using analog autoranging ACV with an aperture of 1 PLC or less the first reading after a range change is wrong.

Work-around for use with earlier code versions: Do not use above combination of settings to make ACV measurements or discard the first reading following a range change.
Issue improved with this version of code: The incorrect low pass filter is selected if the ACBAND frequency is set to exactly 1000 when using analog ACV and autoranging.

Work-around for use with earlier code versions: Do not set the ACBAND to exactly 1000 (e.g. use 1001 or 999).

Revision 3,X
Revision 2,X
Revision 1,X
Note: Service Note 3458A-02A recommended that all users of the 3458A update to Revision 3,X

firmware. Any 3458A instruments with either Revision 1,X or Revision 2,X should upgrade to the current Revision 8,X code. These instruments all use the 6 ROM upgrade kit and have IC sockets for these parts which makes the upgrade easy to accomplish.

   Solution/Action:

Use the "REV?" command (available in the menu from the front panel) to determine the firmware revision in the 3458A. Review the list of changes described for all revisions with numbers higher than the revision in the 3458A to determine if an upgrade is desired.

Upgrade Process:
3458As with Option 700: All 3458As with the CIIL language option (Option 700) cannot be updated to Revision 9.   If you wish to keep your CIIL option you must continue to use Revision 8 firmware.

3458As with code Revisions 1,X through Revision 6,X: These instruments all require the 6 ROM upgrade kit. Referring to the "Parts Required" table above, the A5 assembly will be either a 03458-66505 Revision A assembly or a 03458-66515 Revision A assembly. The parts that come in the upgrade kit will be used to replace U110-U115 (These parts are all in IC sockets). The reference

designators U110-U115 are clearly marked on the A5 assembly. The part numbers in the kit and their appropriate reference designators are:
Part Number (Reference Designator)
03458-88890 (U110)
03458-88891 (U111)
03458-88892 (U112)
03458-88893 (U113)
03458-88894 (U114)
03458-88895 (U115)

3458As with code Revision 7,X: The A5 assembly will need to be visually inspected to determine which upgrade kit will be required. If the A5 assembly is either a 03458-66505 Revision A assembly or a 03458-66515 Revision A assembly. Then follow the above described procedure (Revision 1,X through 6,X) to accomplish the code upgrade.

The upgrade will be a single ROM (U 110) if the A5 assembly is any of the following: a 03458-66505 Revision B; a 03458-66515 Revision B; a 03458-66505 Revision C; a 03458-66515 Revision C. assembly. This single ROM is a 64-pin through-hole IC that is soldered to the A5 assembly. Care must be used when replacing U110 to avoid damage to the A5 assembly (note: an alternative strategy to accomplish this upgrade is to utilize an appropriate "rebuilt assembly")