

REV A: 29 MAR 84 dated 29.3.84

\*\*\*\*\*

REV B: dated 17.7.84

- BUGS FIXED:
1. Slow response to front panel keys in narrow resolution bandwidths.
  2. Instruction "PEAKS" would not work unless threshold line was turned on (visible).
  3. Calibration data for displayed at wrong size for KSw command.
  4. "SIGID" feature worked incorrectly if harmonic lock was enabled.
  5. "SIGID" with diagnostics on and slow sweep times caused erratic sweep or non existent sweep.
  6. Instruction "MKPKxx" did not update amplitude.
  7. HPPIB command "OA" was not compatible with 8566A version which output a leading space before the data.
  8. YTX hysteresis would build up if CF was moved in small steps.
  9. Instrument would lock up if in zero span and marker delta was between -90 msec and -99.9 msec. Instrument Preset would clear the lock up.
  10. Marker delta with amplitude markers worked incorrectly.
  11. Sweeptime of 10 msec resulted in 1 msec sweep.

In addition, firmware now supports external mixer operation down to and including the LO's first harmonic.

\*\*\*\*\*

REV C: 14 JAN 85 dated 14.1.85

REASON FOR CHANGE: Major capability increase and bug fix.

New naming conventions for the source and relocateable files were adopted for this release:

Source files begin with GLF or MTE (MTE stands for MATE and includes optional code to deal with the MATE version of the instrument) followed by 4 characters to name the file (for files that are unique to the 8566 or 8568 one of those letters will be a 6 or an 8). The last letter will be the revision code of the routine. Note all routines beginning with MTE have no revision yet because this is the first release.

Example: GLFPLOTc refers to the plotter dump routine. The C denotes that this routine has been changed during the

process of creating revision C of the firmware.

Relocateable files begin with GLR or MTR and match the rest of the name. Example the relocateable for GLFPLOTc is GLRPLOTc. Those files which have two compile options will have two relocateable files (eventually). The file for the standard product begins with GLR and the file for the optional product (such as MATE) begins with MTR. The MATE version has not been released yet, so those relocateables do not appear in the history file at this time.

Changes made with this revision:

A. New Commands:

- ENTER adrs,fmt,item <enter from HPPIB>
- OUTPUT adrs,fmt,item <output to HPPIB>

RELHPIB <release hpib--reset hpib chip>

PRSDAC value <set preselector DAC in 8566>

ERASE <erases all user defined memory and recall reg's>

ABS dest,srce <absolute value> Added for MSA compatibility  
 INT dest,srce <integer function> " " " "  
 MOD dest,srce <modulus function> " " " "

IFTKNL trcreal,trcimag <inverse FFT kernel>

MIRROR dest,srce <mirror image of trace-frequency domain>  
 MERGE dest,dstrt,dend,srce,strt <merge piece of source trace  
 into destination trace>

MINPOS trace <returns the  
 position (x) of the minimum value>  
 PKPOS trace <returns the position (x) of the peak value>  
 CENTROID trace <returns the position (x) of the centroid of the  
 area under the trace>

B. Deleted Commands (FFT is now 16 bits instead of 32).

FFTADD <32 bit trace add>  
 FFTCNV <convert 16 bit trace to 32 bit trace>  
 FFTMPY <32 bit trace multiply>

C. Changes to commands:

COMPRESS <end points of trace are handled better.  
 Will compress from one arbitrary size to another.  
 Need not have an integer number of buckets per  
 compressed point.>

DISPOSE ALL <now erases all user defined memory>  
 DONE <fix so can be used in downloadable--e.g. MOV>  
 EP <Will enable the numeric entry keys when in remote>  
 FFT <FFT is now 16 bits not 32--goes faster.  
  
 FFT length (number of points is chosen according  
 to the trace length. Carrier level is now  
 displayed correctly. This is same FFT package in  
 MSA.  
 Amplitude is adjusted for proper display on CRT>

IF THEN ELSE <nesting fixed>  
 MKOFF <turn off marker 1 if no marker listed as active  
 marker>  
 MKP <when in delta mode MKP? would return absolute  
 position instead of delta position>  
 MKPAUSE <8568 only: mkpause would not finish the sweep  
 after pausing at the marker>  
 MPY trace,trace,variable  
 <if variable contained zero the trace was not  
 zeroed correctly.>

ONEOS,ONSWP,TRMATH <keyboard entry is saved and restored when  
 these functions are executing.>

PDA <fix for log scale (1,2,5 dB /) resolution>  
 PLOT <will pull SRQ 16 if enabled. A CRLF with EOI is  
 output as the last item. An anomaly in the 85662  
 was copied into the plot routine--the X display  
 position was not incremented in the character  
 mode when a control character was encountered.  
 Wraparound in character mode is now fixed.  
 HPiB abort handling for the plotter was  
 ruggedized.>

PWRBW <now places markers on trace to show power bandwidth>

REPEAT UNTIL <nesting fixed--parser bug fixed which failed to restore the input buffer pointer on completion of the loop.>

REV <had wrong year calculation in datecode>

RL <in log display mode RL 100 MV failed--now fixed>

RQS 16 <will generate a SRQ 16 on input buffer empty and EOI on the last character in the buffer. Will also generate SRQ 16 on completion of a PLOT command regardless of whether an EOI was received or not.>

STDEV <N-1 instead of N used>

TA TB etc <Dumped one to many points in O1 or O3 format. Trailing comma or etx caused only one value to be dumped. Also an EOI not concurrent with a CR or LF caused only one value to be transmitted.>

TDF <now sets O1..O4 correctly for TA,TB, etc>

TRA value,value...value <Fixed ascii mode input to traces (any trace) now works. Would start at arbitrary place in trace.>

USTATE <checksum error on input corrected--never worked>

VARIANCE <N-1 instead of N used>

VAVG <ON and OFF will now work>

8566 unique commands:

AMB ON <was executed twice>

FPKA <fix so can be used in downloadable--e.g. MOV>

IDSTAT <fix so can be used in downloadable--e.g. MOV>

MKREAD FFT <now forced to 10 dB/ division>

#### D. Changes to HPIB

1. The interrupt routine checks for next character available before returning (processes it if available).
2. Binary trace input/output bug (caused check leds to come on) was fixed--I/O abort condition and race condition in hardware.
3. Output abort conditions were ruggedized. Should fix KSw problems.
4. Better handling of EOI on input.
5. Binary input (learn string, etc) fix lockup if TS or PP encountered by interrupt routine in high speed block input routine.
6. Parity bit stripping by parser (fix for Raytheon controller).
7. The parsing tables have been hash coded to speed them up. Results in 2x to 10x improvement in parsing speed for all 'B' commands (especially downloadables).
8. Conflict resolution of A vs. B commands is now faster.
9. When talk addressing another instrument, the input buffer is cleared.
10. Commands requesting binary outputs (OL,TA, etc) followed by a semicolon will now accept the semicolon--caused hangup on enter statement.
11. Secured the user defined functions in CMOS memory from inadvertant erasure (if doing DISPOSE xxx and IP key is pressed) Initial power on of processor board is improved--checksum added to symbol table pointers to validate user defined memory.

#### E. Changes to 8566 operation.

1. Millimeter bands: frequencies greater than 330 GHz could lock

up the analyzer.

2. Instrument check leds: will now come on at power up until self check is complete.
3. Marker Zoom: auto coupled resolution bandwidth now changes correctly--wouldn't change before.
4. HSWP dropping caused re-phaselock, now sweep continues without re-phaselock. This is a performance improvement to help the RF preselector.
5. When EE or EP are activated in remote the following keys were also activated--HOLD SAVE LoBAND RECALL PRESEL-PEAK--they are no longer active.
6. Reference level offset in dBmV and dBuV erroneously added in the level shift for these units.
7. Frequency jump on key pressed (dropped through phase lock routine) now re-executes phase lock.
8. KSJ (DACS) would not send out the zero until a keyboard entry was completed--now activates the mode immediately.

F. Changes to 8568 operation.

1. Tuning delay in STEPD (attempted to phaselock with L.O. greater than 1700 MHz) fixed.
2. If in EXT trigger mode and a key pressed during sweep the sweep would stop and not continue when key processing was complete. This is necessary to fix for the preselector.
3. MKPAUSE would not finish the sweep after pausing at the marker

\*\*\*\*\*  
E69 MATE REV A for 8566: 28 FEB 85 dated 27.2.85

REASON FOR CHANGE: Option E69 - mate for US Air Force.

- Bugs fixed: uninitialized variable in CENTRIOD  
added error message to GLFIO for bus contention  
'INVALID HP-IB OPERATION: REN TRUE'  
8566: Two fixes for RF preselector--sweep time and CF offset  
Added Mnemonic 'LOLIMOFF' it turns off L.O. frequency  
limit checking so LOMAD can "roll" to 75 GHz on 12th  
harmonic. IP restores limit checking.

\*\*\*\*\*  
REV.

D - 8566 5 MAY 85 dated: 5.5.85

REASON FOR CHANGE: (Bug Fixes)

1. For spans < N\*5 MHz: After first sweep at new freq, don't drive YTX sample and hold or BFC anymore. This prevents a glitch on sweep+tune out. (ON / OFF offset is 20 MHz).
2. If external device (RF Preselector) pulls hisweep at scan address=1001, current sweep would not complete but a new one would be started (without end-of-sweep processing).
3. In MM band. If bandlocked and CNVLOSS changed. After a sigid the correct CNVLOSS did not get restored.
4. HET

UNLOCK appeared if under HP-IB control and switched from high band to low band, and changed reference levels without taking a sweep.

5. A command for LOMAD mixers was added: "LOLIMOFF" (LO limit off) was added to prevent LO limit error checking when tuning YTO above 6.2 GHz

\*\*\*\*\*  
E69 MATE REV. B for 8566: 14 JUN 85 dated 14.6.85

REASON FOR CHANGE: Error in mate parser - need positive syntax check  
of measured characteristic.  
See MATEERSB.

\*\*\*\*\*  
REV. E - 8566 16 JULY 85 dated: 16.7.85

REASON FOR CHANGE: (Bug Fixes)

1. In zero span and sweeptimes < 20 milliseconds, RPG would not tune center frequency.

\*\*\*\*\*  
REV. F - 8566B : 13 SEP 86 dated 13.9.86

REASON FOR CHANGE: required for 8566B Opt 462 and bug fix on 8566-68

Option 462 is a mil. bandwidth (impulse bandwidth vs. 3 dB) and appends a "(i)" to the RES BW field on screen and affects the sweep-time equations.

Bugs fixed (8566-8568):

Addressing sensitivity to speed (HPIB) fixed. High speed controllers could cause an I/O abort (and hang the system).

Plotter dump now looks for cr and throws it away--solves 7475 handshake problem.

Operation with RF preselector would hang with the operation: "DONE?"

HP-IB number builder has limiter installed to detect overflows.

AUNITS AUTO; will now generate an error.

The following queries now function better.

VAVG ?	CF ?	FA ?	RQS ?	ONEOS ?
ONSWP ?	VBO ?	ROFFSET ?	VIEW TRA?	RMS TRA?
TRDEF NEW?				

Trace names are upshifted in all trace math operations.

MKACT is now initialized at IP and POWER ON.

MOV TRA[ 201] now ignores leading spaces within the brackets.

MKTRACE and MKREAD activates MARKER if none are on.

VARDEF can now be used in a function.

Using add on very small numbers no longer causes errors.

Extension of video average query; so if zero returned, it is off.

8567, 8568 fixes:

CAL routine with 75 ohm option now works.

Limit entry of RF attenuation.

8566 fixes:

TA and TB now remove blank ahead marker from data.

PRESELECTOR PEAK below 2.5 GHz could stop at a YTX mode and not at a peak--was improved by guaranteeing an 8 MHz search either side of the 'peak' before stopping.

If marker was less than the third bucket FPKA would give the wrong answer.

One bucket error at start of band-crossing was removed--cause hole at band-crossing.

Wrong conversion-loss after SIGID if previously locked on a band

SIGID would fail if there was a high RES-BW to SPAN ratio. It will still fail but at much higher ratios.

Harmonics were not optimum for millimeter frequencies.

SIGID would fail if noise was below screen.

#### FULLBAND

would not set correct CONVERSION LOSS and SWEEP TIME.

If analyzer is BAND LOCKED when performing SIGID, it now uses the band range + 10%, not just the locked harmonic to determine if out of band.

Marker Pause "T" would also cause a re-lock "T" seconds into the sweep.

After pausing at marker, the 8566 would hold off HP-IB until the end of sweep.

#### 8566 enhancements:

Added a MM menu that comes on when you enter MM MIXER MODE and added [KS] 1 to 8 MHz for MM mixer functions. Menu display:

[KS] 1 MHz	mm Menu
[KS] 2 MHz	Fullband
[KS] 3 MHz	SIGID-AUTO
[KS] 5 MHz	Conv Loss
[KS] 6 MHz	Signal Delta
[KS] 7 MHz	Search Start HN
[KS] 8 MHz	Search Stop HN

The menu is cleared if any key is pressed.

Added a manual SIGID (it does a shift to image and then drops amplitude one division on alternate sweeps).

If SIGID fails the display shows: SIGNAL NOT IDENTIFIED not RECALL 7.

If SIGID identifies out of band, it now adds AT ##.# GHz

Implemented IDFREQ? for SIGID results: The analyzer outputs signal identified if it is out of band and 0 if it has not been identified.

SIGID now ZOOMS down to 20 MHz instead of 200 MHz SPAN for better frequency accuracy, but returns to 200 MHz for backward compatibility.

SIGNAL TRACK has been made slightly more tolerant of signals that disappear for a sweep or two.

If band-locked when performing SIGID, the specified harmonic is used where feasible, not the default harmonic.

No longer need to be in MM mixer mode before doing FULBAND.

AUTO-ZOOM is now more tolerant if the marker drops off the signal initially.

Preselector Peak routine improved by guaranteeing an 8 MHz search on each side of peak.

A wait of 5%\*(sweep-time - 20 ms) to a maximum of .1 SEC was added for locking the l.o. This helps YTO frequency accuracy for slow sweeps.

All occurrences of UN-LOCK flags are stored at location 16754530 for production testing. This register is cleared by IP.

[KS] 99 MHz will perform the same as KSs for field service.

\*\*\*\*\*  
REV G: 8566B Firmware dated 29.9.86

Reason for change:

In REV F: (13.9.86) Firmware there is a condition that exists where a PRESEL PEAK function is executed and the instrument will be left in a "hung" condition which shows "PEAKING" until the instrument is cleared with IP. When executing the command through the HP-IB, the

instrument will stop talking to the controller. The condition occurs when the instrument's YTX is out of alignment, such that the peak occurs at a DAC number above 56. The firmware algorithm in 13.9.86 requires that the analyzer search 8 DAC numbers below and above the peak, and if that condition does not occur, the instrument keeps searching. The algorithm was changed during 13.9.86 to decrease the possibilities of finding a false peak due to YTX modes around 2 GHz.

REV G (29.9.86) fixes the bug by the following: The peak algorithm is changed so the instrument will not have to search +/- 8 DAC #s when the peak is near the limit of the DAC range, the instrument will only require a drop in amplitude of .5 dB to indicate a peak; an SRQ 110 will be generated if the PRESEL PEAK command does not find a peak under HP-IB control; a message "PEAK NOT FOUND" will be placed on the screen of the instrument; and bit 6 will be set in the error register to indicate no peak found. In addition the instrument

will display "SIGNAL TOO SMALL" if the peak is below the screen and "SIGNAL TOO BIG" if the peak is above the screen.

\*\*\*\*\*  
REV H: 8566B Firmware: Rev 2941, dated 10.10.89

Reason for change:

Support for the HP 11974 Series of Preselected Millimeter Mixers (Corporate Price List: Nov '89) has been added.

Notes:

- A. Data which supports the HP 11974 series is not maintained in the "SAVES/RCLS" registers nor is it incorporated into

the 8566B "learn string." Customers should be cautioned on this point.

- B. Immediately upon installation of new 8566B, Rev 2940 firmware, the customer should execute "KS=" in order to initialize data which will be used to support the HP 11974 series.

#### ERASE:

The ERASE command has been enhanced as follows:

1. Executes a "DISPOSE ALL" to "scrub" (alternatively write a pattern of all "1"s and then all "0"s to RAM) user memory.
2. Scrubs all 85662 RAM (except for location 0, which is set to "end-of-display"). This includes:
  - TRCA
  - TRCB
  - Display Annotation
  - TRCC
3. Scrubs TRCD and "scratch" Trace
4. Scrubs any previously processed data in the:
  - A. Input buffer,
  - B. Output buffer, and
  - C. Key buffer
5. Scrubs all Marker position and status variables
6. Executes an "IP"
7. Executes "SV1;SV2;SV3;SV3;SV4;SV5;SV6;SV7" to scrub and initialize the "save-state registers" and the primary state array.

Note: The new version of ERASE over-rides the "SAVE LOCK" ( "KS(" ) during these "SV" operations, but does not disable (unlock) the "SAVE LOCK" if enabled. Previous versions of "ERASE" honored the "SAVE LOCK" (failed to scrub and initialize the "save-state registers" if the "SAVE LOCK" was enabled).
8. Executes "HD" to blank the active function display readout.

#### DERASE:

A new "undocumented" command, "DERASE" ("Destructive ERASE") has been added to the command set. This command is especially for our more security conscious customers. The "DERASE" command

1. Disables interrupts (except for the "Green Key")
2. Scrubs all 85662 RAM (except for location 0, which is set to "end-of-display").
3. Scrubs all 85660 RAM.
4. Executes a "power-up" program start.

#### Notes:

- A. Since none of the 85660 RAM contents are preserved, following a "DERASE" the 85662 display will indicate a "BATTERY FAIL" condition. This does NOT indicate that the battery has failed.

B. We advise that the "DERASE" command should be sent from the controller to the 8566B as an isolated command. If it is sent in a stream of commands, the commands following the "DERASE" command in the stream will almost certainly not be executed (they will be "lost" when 85660 RAM is scrubbed). After sending a DERASE command to the 8566B, the controller should postpone sending any further commands to the 8566B until the DERASE command has completed execution )approx 3 sec).

Sending commands to an 8566B which is executing a DERASE can yield unpredictable I/O states and results .

Average (AVG) and Video Average (VAVG or KSG):

Averaging execution routine has been fixed so that values

are effectively rounded instead of truncated. This fix is patterned

after a similar fix to MSA's averaging routine.

BRD() and BWR():

"BRD" and "BWR" commands to addresses in the 85662's I/O space have been modified to do "synchronized" reads and writes to the 85662 read/write registers. This change should eliminate any sporadic anomalies which may have been noticed when using "BRD" and/or "BWR" commands to addresses in the 85662's I/O space.

Marker 4:

In previous revisions, a potentially problematic interaction between Marker 4's location/status data and state flags for "AMB" (A minus B) and "ANNOT" (annotation) existed. This has been fixed and users may find Marker 4 to be more "reliable."

FOFFSET:

Frequency display/data errors resulting from use of the "FOFFSET" command have been corrected.

Note: This fix had previously been shipped as part of a "Special" 8566B bug-fix release

Option 462:

The 8566B now explicitly interrogates for the presence of Option 462 rather than testing for its absence. This change should prevent

the analyzer erroneously "finding" Option 462 to be installed when it is actually not.

Note: This fix is "new" to the 8566B, but has been incorporated into the 8568B code set since December 1986.

\*\*\*\*\*  
E69 MATE REV C dated 4.1.90 (6-ROM set)

Reason for change:

- 1.) Each INX results in a complete setup - slightly slower, but ensures that video average counter is reset correctly.

\*\*\*\*\*  
COCOM Option 1BH dated 30.1.91

Reason for change:

- 1.) Changes permit sale to Eastern European nations under current

technology export restrictions.

\*\*\*\*\*

E69 MATE REV D

dated 15.2.91 (6-ROM set)

Reason for change:

- 1.) Added MKBW() function to correct problems with FTH BAND.
- 2.) Incorporated native '66B Filly (11974 series) changes.
- 3.) NOT FOR SALE: Incorporated native '66B TURBO processor upgrades.

These roms should only be installed in a NON-TURBO processor assy.

\*\*\*\*\*

Option 002 TURBO

dated 12.4.91

Reason for change:

- 1.) Upgrade for TURBO (2X speed) A15 Processor Assy.