GRAS 246AE SysCheck2 Software Development Kit Instruction Manual

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Contents

SysCheck2™ Software Development Kit

Any feedback or questions concerning this document are welcome at gras@grasacoustics.com

Revision	Date	Description
1	11 Mar 2022	SDK version 2.0.8 Layout changes only

Instruction Manual

Introduction

SDK for 246AE and 246AO microphones overview

SysCheck2™ is a GRAS-patented technology for verifying measurement chain integrity. This verification tool performs remote health check on microphones, channel gain and cable integrity. The verifications are made on each SysCheck2-enabled microphone connected to a CCP power module with transducer electronic data sheet (TEDS) support and measurement software with one click.
This software development kit (SDK) enables access to the SysCheck2 functionality.
You will need an analyzer with the ability to connect to a CCP-based microphone and the ability to read and write to TEDS. Alternatively, you can use a CCP-capable power analyzer with a non-CCP-capable analyzer or sound card with TEDS read-write capability. Because the required hardware is built into the microphone itself (Fig 1), no further specialized hardware is needed.

246AE, 246AO specification

The acoustic specification is like GRAS 46AE.
Syscheck2 generator specification (over temperature range -30°C to 85°C):
Frequency, sine: 250Hz
Frequency stability: ±3%
Amplitude level stability: ±0.03dB
Amplitude level tolerance: ±1dB
Harmonic distortion: -40dB
Output level with no microphone: -1.1dBV
Output level with 246AE (Cmic: 14pF): -27dBV equivalent to 93 dBspl
Output level with 246AO (Cmic: 20pF): -27.5dBV equivalent to 105.5 dBspl
Environment sensor: (operational -40°C to 85°C)
Temperature : ±2°C (0°C to 65°C)
Pressure static: ±1.5hPa (0°C to 65°C, 300hPa to 1100hPa)
Humidity relative: ±4% RH (0°C to 60°C, 0 to 100%)
Temperature sensor in CPU: (operational -40°C to 125°C)
Temperature : typical ±3°C (-40°C to 125°C)

Syscheck2 behavior

Syscheck2 has a very well-defined coupling of the test signal to the microphone, due to precision coupling capacitor with a guarded signal path from the generator in close proximity, resulting in reliable test results over a wide frequency range due to no stray coupling of test signal to preamplifier, polarization voltage or in transmission cable.
Syscheck2 generator level has very little influence from of temperature, the Syscheck2 measurement therefore reflect the change of capacity of the microphone. The membrane capacity has a slight frequency dependency, but not enough to verify the frequency response. Causes to change in microphones capacity are change in temperature, change in polarization voltage, change membrane tension and damages to the microphone housing

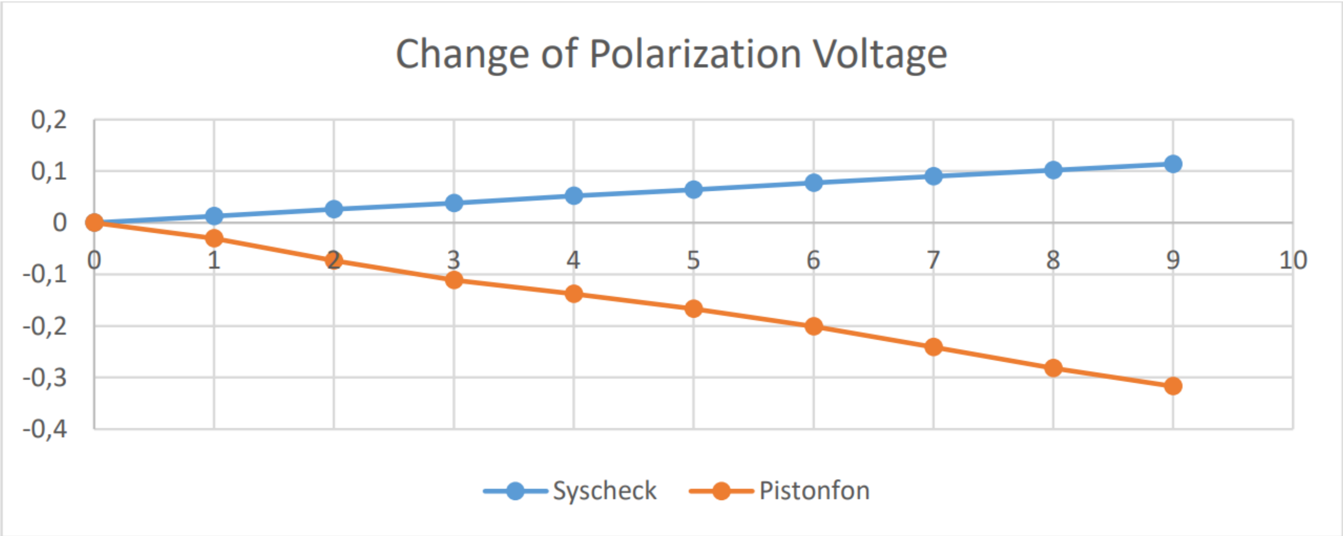
or the membrane. Testing the capacity at medium frequencies e.g. 250Hz, can verify the general sensitivity of the microphone. The Syscheck2 can reveal sensitivity change due to temperature, but not to change in pressure or humidity.

The microphone sensitivity depends on temperature and static pressure; therefore, temperature and static pressure need to be accounted for. An environment sensor is included for this purpose.

Syscheck2 dependency of polarization voltage

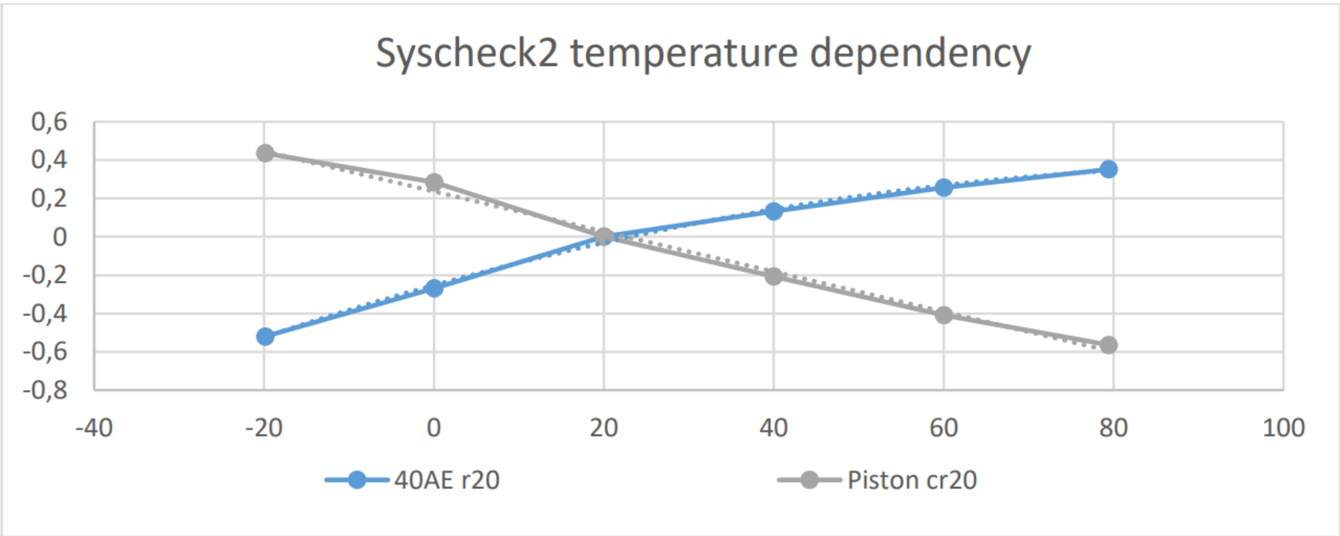
Influence of polarization voltage on sensitivity of the microphone and Syscheck2 measurement.

Decrease in sensitivity of 0.3dB due to reduction of polarization voltage results in increased Syscheck2 voltage of 0.1dB.



Syscheck2 dependency of temperature

Influence of temperature on sensitivity of the microphone and Syscheck2 measurement.



40AE r20: is the Syscheck2 measurement with the load of 40AE Piston cr20: is the measurement of the 40AE sourced by the pistonphone.

Syscheck2 usages

In the simple use where environment condition has not changed, a relative check with Syscheck2 @250Hz before and after will ensure that the sensitivity has not changed more than 4 times the Syscheck2 change in dB (in other words if the Syscheck2 has changed 0.05dB the microphone sensitivity is expected to be within 4*0.05dB ~ ±0.2 dB.

Since the change can originate from different things, such as change in membrane tension, change in mechanical or change of charge, the sign of the change cannot be determined.

If temperature, ambient pressure, and humidity has changed, the sensitivity of the microphone might also have changed. Initial when the reference Syscheck2 measurement is made the temperature, ambient pressure and humidity can read from 246AE or 246AO and memorized together with the measurement. If only temperature has changed the Syscheck2 verification can be corrected for this.

Note:
No temperature correction is made automatically in neither 246AE or 246AO.
The validation with Syscheck2 corrected for temperature, verifies that the microphone is working correct, but the sensitivity might have changed, the microphone sensitivity will need to be corrected for temperature. The temperature coefficient of the microphone set 246AE and 246AO is -0.01dB/°C.
To avoid ambient noise disturbing the Syscheck2 verification, the ambient noise must be reasonable low.
Notes:

- using a 1/3 octave narrow band measurement the noise level of 60dB during test, will typically influence less than 0.2dB.
- If the microphone is calibrated to -25.5dBV/Pa @ 23°C, the sensitivity correction of 246AE microphone @ 35°C is -0.01*(35-23)dB = -0.12dB, the sensitivity @ 35°C will be -25.5+(- 0.12)dBV/Pa = -25.62dBV/Pa.

Example of use case:

1. Together with a calibration of the microphone, make a Syscheck2 reference measurement:
   a. Measure the Syscheck2 level, e.g -27.20dBV
   b. Read the temperature from the TEDS, e.g. 25°C These data can be used to verify the microphone later.
2. In the field when a verification of the microphone is needed:
   a. Measure the Syscheck2 level, e.g -27.03dBV
   b. Read the temperature from the TEDS, e.g. 35°C
   c. Calculate temperature corrected verification 1): SC_level_corrected = SC_level_measured – ((Ta)
   2* TC2 + Ta * TC – ((RT)
   2* TC2 + RT * TC))
   → SC_level_corrected = -27.03 – ((35)2 * -96.0E-6 + 35 * 16.1E-3 – ((25)2 * -96.0E-6 + 25 * 16.1E-3)) = -27.13 dB

Verification deviation (Difference to Syscheck2 level): DSL = | SC_level_corrected – RL | = | -27.13 – (-27.20) | = 0.07 dB Use DSL result for evaluating Acceptance level according to the following:

Acceptance Level	Syscheck2 Level (DSL)	
	Green	Red
0.3	DSL <= 0.08	DSL > 0.08
0.5	DSL <= 0.13	DSL > 0.13
0.8	DSL <= 0.21	DSL > 0.21

I.e. the microphone is expected to measure correct within 0.3 dB according to the above scheme (when corrected for change in the environmental condition).
Note: If the microphone is calibrated to -25.5dBV/Pa @ 23°C, the sensitivity correction of 246AE microphone @ 35°C is -0.01*(35-23)dB = -0.12dB, the sensitivity @ 35°C will be -25.5+(- 0.12)dBV/Pa = -25.62dBV/Pa.
1) Read TC2 and TC from the user data, can be recalled by command tc2 and tc, in this example is used tc2 = -96.0E-6 and tc = 16.1E-3

246AE, 246AO firmware 1.8

Firmware change log
Firmware 1.8 bug fix: Added space between t command and response Uppercase gto to Gto after use
Control via user data in template UDID I27-0-0-0U
In user data the Syscheck2 communication is encapsulated, starting with “{:“, and the communication terminated with “}”, before and after this the user data is free to use.
Behavior:

In digital mode:
Normal IEEE 1451.4 TEDS mode, chip used DS2431.
In analog mode:
Reads and act upon content of the TEDS.
If generator has been enabled in TEDS, it will turn on in analog mode the and the “f” in the user data will be changed to “F”, ensuring that the generator will not turn on again automatically, except if generator timeout has been specified, in this case the generator will always start and turn of after the specified time.
The line drive capacity is reduced with 1.2mA when LED is on, and with 0.7mA with generator on Normal analog mode is not affected, Syscheck2 idle current is typical 5uA.
The user data commands defined for are: The command string is preceded by “{:” and terminate with “}”
Each command in the command string must be followed by the needed spaces for the response, shown in each command in parentage.
Commands are in general disabled after first use, this is done by uppercasing the first command letter. For the LED command’s this can be disabled by the command “a”.
The protocol for control and response in user data used by GRAS is identified with a Pid: The Pid is a HEX number which defines the capabilities, each bit in this number indicates if a set of command / response is supported.
Definition is open to append more bits, once the interpret of a bit is defined by GRAS it’s definition will not later be changed.
246AE, 246AO will return “Pid 00003F”.
Commands shall be separated by a space.
The figure in parenthesis designates the total needed field width of the command.
pid (11) : Will return protocol ID in hex, e.g. 246AE returns Pid 00003F.
f : Generates a sinewave at frequency 250Hz, it will be disabled after used, by changing f to F.
tc2 (14) : Will return the tc2 in the user data, e.g. Tc2 -96.0E-6
tc (13) : Will return the tc in the user data, e.g. Tc – 16.1E-3
gto # : Generator time out in sec., max value 225sec, gto 60 will turn of the generator after 1 min.
fw (8) : Will return firmware version in user data, e.g. Fw 1.8
hw (8) : Will return hardware version in user data, e.g. Hw 3.0
t (8) : Requests the temperature, the TEDS will be updated when Analog mode is entered with the CPU temperature in °C (accuracy is reduced, but operational up to 125°C) e.g. “t 90.3 ” env (18) : Requests environmental condition in the preamplifier, the TEDS will be updated when Analog mode is entered with the temperature in °C, the ambient pressure in hPa and relative humidity in %, e.g. “env 23.4 1009 43 “.
r # : Turn on LED red 2,3)
g # : Turn on LED green 2,3)
b # : Turn on LED blue 2,3)
x # : Turn on all LED one at a time 2,3)
a : disables disable after first use for LED’s
RL # : Ref level in db : RL # 1)
RF # : Ref frequency in Hz : RF # 1)
RT # : Ref temperature in °C : RT # 1)
RP # : Ref pressure in hPa : RP # 1)
1) The Capital letters are not interpreted by 246AE and 246AO.
2) If xrgb is followed with a # the LED will turn off after # sec. (max 600sec.), if no # is applied it will turn off after 5sec.
3) the noise floor will be a bit higher while the LED is on.
Factory defaults for 246AE and 246AO looks like this:
User data for 246AE and 246AO:
“246AE {: Pid 00003F F Env 23.0 1013 50 RL -27.00 RT 23.0 RP 1013 Tc2 -96.0E-6 Tc 16.1E-3 G 010 }”
“246AO {: Pid 00003F F Env 23.0 1013 50 RL -27.00 RT 23.0 RP 1013 Tc2 -85.0E-6 Tc 10.2E-3 G 010 }”
Note: both padded with spaces to allocate space for response, total length 101 chars.
Examples:
User data: “{: f RL -26.20 RT 24 rgb }”, the last } stops the interpret of commands. This will flash r, g, b led each in 5 sec. (default), and turn on test signal, which will stay on while in analog mode.
User data: “{: f RL -26.20 RT 24 g2 }”
This will hold green LED on for 2 sec and turn on test signal, which will stay on while in analog mode. User data: “{: RL -26.20 RT 24 bg2 }”
This will hold blue LED on for 5 sec followed the green LED on for 2 sec, and normal measurement can be done, the noise floor will be a bit higher while the LED is on. User data: “{: f gto 45 RL -26.20 RT 24 g2 }”

This will hold green LED on for 2 sec and turn on test signal in 45sec. and return to normal measurement in analog mode.
User data: "{: f gto 45 RL -26.20 RT 24 env g2 }" This will measure temperature, air pressure and relative humidity in the preamplifier and write these into user data, then hold green LED on for 2 sec and turn on test signal in 45sec. and return to normal measurement in analog mode.

Description of the interactions between integration software and Syscheck2 mic set

Abstract:

This chapter is made to help system integrators to retrieve information and communicate with a Syscheck2 microphone set. It is a step by step instruction based on three different functions that needs to be included in the integration software.
Notes: In this description we use a 246AE. The procedures are unchanged*) when using another type of Syscheck2 microphone set (i.e 246AO).
***)** only change is for temperature and pressure coefficients
Requirement Specification for User Interface:
<u>Temperature will be handled in Celcius. Unit conversion to Fahrenheit shall only be informal to the user.</u>
<u>Acceptance level:</u>
User must be able to select an acceptance level based on a choice list (drop down list?). Current acceptance limit thresholds are; 0.3dB, 0.5dB & 0.8dB
<u>Syscheck2 Result:</u>
User interface needs to show the Syscheck2 result, e.g. with 2 colors; Green & Red depending on the Syscheck2 Level result compared to the acceptance level.

Criterias for colored verdict read out:

Acceptance Level	**Syscheck2 Level (DSL)**	
	Green	Red
0.3	DSL <= 0.08	DSL > 0.08
0.5	DSL <= 0.13	DSL > 0.13
0.8	DSL <= 0.21	DSL > 0.21

<u>Warning about change in temperature and static pressure</u>
A warning message should be displayed with an indication if difference between calibration conditions and daily conditions results in measurement error larger than 0.2dB.
Message text example: "It is advised to compensate measurements, as change in temperature and static pressure since Syscheck2 reference were made may cause a measurement correction of more than 0.2dB".
In the following, small changes in Syscheck2 user data is tracked by marking changes in **red** color.
Function «Retrieve env parameter»

This function is used in the case where the user wants to retrieve temperature, humidity and atmospheric pressure from the sensor present in the microphone set.
The outcome of this function is readouts of current temperature (in °C), humidity and atmospheric pressure:

General Timeline

Step by step Execution

// in this example we use a 246AE, user data contains
//"246AE {: Pid 00003F F Env 23.4 1008 47 RL -27.00 RT 23.1 RP 1013 Tc2 -96.0E-6 Tc 16.1E-3 }"
// Only data between "{:" and " }" in user data is modified in the following. All other TEDS
// data is preserved.
//note: If Pid is not present, function routine shall be aborted and user notified that "system can not decide whether a Syscheck2 transducer is present. Encourage to >Make Syscheck2 reference< to clear out"
1) Enter DIGITAL mode
2) Read from TEDS user data into local string
3) Localize Syscheck2 data Pid, Tc2,Tc, RL, RT and RP between "{:" and " }", these values are needed later on.
// Now, we want to setup TEDS to retrieve the env parameters
// concatenate Pid, Tc2, Tc, RL, RT and RP together with the command for env
4) Replace Syscheck2 data in TEDS user data with: "{: pid 00003F F env 23.4 1008 47 RL -27.00 RT 23.1 RP 1013 Tc2 -96.0E-6 Tc 16.1E-3 }"
// I.e. only the upper case Pid and Env is changed with the lower case pid and env
// note: preserve user data outside Syscheck2 data i.e. the content of TEDS user data will in
// this example be
// "246AE {: pid 00003F F env 23.4 1008 47 RL -27.00 RT 23.1 RP 1013 Tc2 -96.0E-6 Tc 16.1E-3 }"
5) Exit DIGITAL mode → Enter ANALOG mode

6) Wait 2000 ms in order for Syscheck 2 to process
// In this example Syscheck 2 process will update the user data with environment information
// "246AE {: pid 00003F F env 23.4 1008 47 RL -27.00 RT 23.1 RP 1013 Tc2 -96.0E-6 Tc 16.1E-3 }"
// to
// "246AE {: Pid 00003F F Env 27.4 1008 40 RL -27.00 RT 23.1 RP 1013 Tc2 -96.0E-6 Tc 16.1E-3 }"
7) Exit ANALOG mode -> Enter DIGITAL mode

8) Read user data eg.: "246AE {: Pid 00003F 27.4 1008 40 RL -27.00 RT 23.1 RP 1013 Tc2 – 96.0E-6 Tc 16.1E-3 }", where

t=27.4, p=1008 and h=40 are the newly sensor measured values of temperature, pressure and humidity.
//note: If env is not changed to Env by the sensor during the procedure in 6), environmental data are not updated.
9) Log Env data locally (t, p, h) + standard TEDS information (Model & serial no & sensitivity) + other data of interest (e.g. time stamp or other system integrator parameters
10) Exit DIGITAL mode → Enter ANALOG mode
11) * allow minimum 5 seconds for ANALOG microphone state to stabilize before starting measurement
Function «Make Syscheck2 reference»
This function is used in the case where the user wants to create a reference Syscheck2 level (after the user has ensured that the system is measuring correct i.e. calibration has been verified).
The integrator software will analyze the level of the sinusoidal tone produced by the microphone set internal generator.
The outcome of this function is to generate a new Syscheck2 Reference Level and Reference temperature to be stored in TEDS.
Only the data present in the user data allocated place in the TEDS chip will be actively used.
General Timeline

Step by step Execution

// in this example user data contains
// "246AE {: Pid 00003F F Env 23.4 1008 47 RL -27.00 RT 23.1 RP 1013 Tc2 -96.0E-6 Tc 16.1E-3 G 10 }"
// Only data between "{:" and " }" in user data is modified in the following. All other TEDS
// data is preserved.
1) Enter DIGITAL mode
2) Read from TEDS user data and store into local string
3) It should be tested whether a Syscheck2 transducer is present
3.1 Inform user that user data will be overwritten in the initialization process
3.2 Write following to user data: "{: pid 00003F }"
// note: pid will be updated to Pid by Syscheck2 enabled transducer
3.3 Enter analog mode for 2000 ms and switch back to digital mode to let transducer update
3.4 Read user data and check if pid is updated with "Pid 00003F" (which means Syscheck2 is alive) and jump to 5)
3.5 If pid is not updated, restore TEDS user data from local string in 2) into user data of the transducer for bringing user data back to untouched state. Inform user that no Syscheck2 transducer is present and exit >>Make Syscheck2 reference<< function.
4) Now, we want to setup TEDS to retrieve env parameters and generate a tone from generator at the default frequency 250Hz
5) Replace Syscheck2 data in TEDS user data with: "{: Pid 00003F f env 27.4 1008 40 RL -27.00 RT 23.1 RP 1013 tc2 -96.0E-6 tc **16.1 E-3 }", note: env, tc2 and tc will be updated by 246AE/O**
6) Exit DIGITAL mode → Enter ANALOG mode

7) Wait 5000 ms (The system is asynchronous and we need to wait long enough for fetching and writing the env data, for the generator to start and for the microphone analog mode to stabilize)
8) Acquire 3000 ms of measurement data;
// Find dBV level of measurement data around 250Hz +/- 3% by
// system integrators "standard" routine for calibration with narrow band filter to reduce noise.
// store dBV level as "measured_SC_level" *see note
9) Exit ANALOG mode → Enter DIGITAL mode

10) Read user data eg.: “{: Pid 00003F F Env 21.5 1013 54 Tc2 Tc2 -96.0E-6 Tc 16.1E-3 }”
11) Localize Syscheck2 data Tc2, Tc, and derive p and t from Env between “{:” and “ }”, these values are needed for step 13
12) Set RL=measured_SC_level; eg. -26.95 Set RT=t; eg. 21.5Set RP=p; eg. 1013
13) Write TEDS Syscheck2data: “{: Pid 00003F F Env 21.5 1013 RL -26.95 RT 21.5 RP 1013 Tc2 -96.0E-6 Tc 16.1E-3 b3}”
// b3 meaning blue LED ON for 3 seconds, indicating Syscheck2 ref is done.
14) Exit DIGITAL mode → Enter ANALOG mode

15) Log (optionally) data locally (RL, RT, RP, h) + standard TEDS information (Model & serial no & sensitivity) + e.g. time
16) Present “Syscheck2 reference captured” screen to user.

Function «Syscheck2»

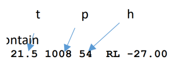
This function is used in the case where the user has already created a reference Syscheck2 level and wants to compare it to the actual microphone set.
The system integrator software will analyze the level of a tone produced by the microphone set, correct it with the current temperature, and compare it to the Syscheck2 reference level.
Also, a warning should indicate if temperature is too far from reference level temperature.
The outcome of this function is to perform a system check.

General Timeline

Step by step Execution

// in this example user data contains
// “246AE {: Pid 00003F F Env 27.4 1008 40 RL -27.00 RT 23.1 RP 1013 Tc2 -96.0E-6 Tc 16.1E-3 G 010 }”
// note: If “Pid 00003F” is not present, function routine shall be aborted and user notified that “system can not decide whether a Syscheck2 transducer is present. Encourage to perform >>Make Syscheck2 reference<< to clear out”
1) Enter DIGITAL mode
Only data between “{:” and “ }” in user data is modified in the following. All other TEDS data is preserved.
2) Read from TEDS user data into local string
3) Localize Syscheck2 data Pid, Tc2, Tc, RL, RT and RP between “{:” and “ }”, store each variable locally. If Tc2, Tc, RL, RT and RP is not present in user data, inform user that Syscheck2 data is missing and encourage to perform >>Make Syscheck2 reference<< to clear out” and exit >>Syscheck2<< function.
// **If Tc2, Tc, RL, RT** and **RP** are present, we want to proceed and setup TEDS to retrieve env parameters and generate a tone from generator
4) Write string to TEDS user data: “246AE {: Pid 00003F f env 27.4 1008 40 RL -27.00 RT 23.1 RP 1013 Tc2 -96.0E-6 Tc 16.1E-3 G 010 }” ? // F and Env is changed to lower case f and env
5) Exit DIGITAL mode → Enter ANALOG mode

6) Wait 5000 ms (wait long enough for fetching and writing the env data, for the generator to start and for the microphone analog mode to stabilize)
7) Acquire 3000 ms of measurement data;
// Find dBV level of measurement data around 250Hz +/- 3% by
// system integrator "standard" routine for calibration with narrow band filter to reduce noise.
// store dBV level as "SC_level_measured" ? *see note
8) Exit ANALOG mode → Enter DIGITAL mode

// TEDS user data should now contain "246AE {: Pid 00003F F Env 

RL -27.00 RT 23.1 RP 1013 Tc2 -96.0E-6 Tc 16.1E-3 G 010 }
9) Read userdata: "Env" and split into t, p and h variables and store locally for use in the following.
10) Calculate SC_level_corrected SC_level_corrected = SC_level_measured – ((t) 2 * Tc2 + t * Tc – ((RT)2 * Tc2 + RT * Tc))
Note: Tc and Tc2 has been read from Syscheck2 transducer.
Use the following criteria for evaluation whether microphone is within chosen acceptance level: Calculate DSL, which is the distance from recent SC_level_corrected to the microphone Syscheck2 reference level RL. DSL = | SC_level_corrected – RL |

Acceptance Level	Syscheck2 Level (DSL)	
	Green	Red
0.3	DSL <= 0.08	DSL > 0.08
0.5	DSL <= 0.13	DSL > 0.13
0.8	DSL <= 0.21	DSL > 0.21

11) ENTER DIGITAL mode and write evaluation to TEDS
// if GREEN: write userdata:
//"**246AE** {: "246AE {: Pid 00003F F Env 21.5 1008 54 RL -27.00 RT 23.1 RP 1013 Tc2 – 96.0E-6 Tc 16.1E-3 g 010 }"
// If RED: write userdata:
//"**246AE** {: "246AE {: Pid 00003F F Env 21.5 1008 54 RL -27.00 RT 23.1 RP 1013 Tc2 – 96.0E-6 Tc 16.1E-3 r 010 }"
12) Exit DIGITAL mode

13) Log data (optionally) locally (t, p, h, SC_level_corrected) + standard TEDS information (Model & serial no & sensitivity) + time   On system integrator side
14) Present Syscheck2 evaluation to user.
// Green = Syscheck2 OK, Red = Syscheck2 NOK If microphone sensitivity correction (see notes) is more than 0.2dB then display the message: "It is advised to compensate microphone sensitivity, as change temperature and static pressure since Syscheck2 reference were made may cause a measurement correction of more than 0.2dB".

NOTES:

- If either one of the following variables Pid, Tc2, Tc, RL, RT and RP are not present in the TEDS user data the Syscheck2 can not be evaluated and should terminate with a note to the user.
- All variables (Pid, Tc2, Tc, RL, RT and RP) can be created by calling >>Make Syscheck2 reference<<
- Background noise should be lower than 65dBspl for 246AE and 77dBspl for 246AO
- The temperature sensor has reduced specifications outside [0…65 °C]
- If the temperature is higher than 85 °C, the env value is set to 85. User should be alerted.
- If the current temperature and atmospheric pressure results in change in microphone sensitivity of more than 0.2dB, since Syscheck2 reference were made, the user should be notified;

Sensitivity correction = |(t-RT)*sensTC + (p-RP)*sensPC |
If Sensitivity correction is more than 0.2dB then display the message :
“It is advised to compensate microphone sensitivity, as change temperature and static pressure since Syscheck2 reference were made may cause a measurement correction of more than 0.2dB”.

RL = Syscheck2 reference level, designate with 2 decimals
RT= Syscheck2 reference temperature, designate with 1 decimals
RP= Syscheck2 reference atmospheric pressure, designate with 0 decimals

Vmeas= measured output from analysator [Vrms], uncorrected for environment.
t = Measured output from the temperature sensor (env)
TC = Syscheck2 temperature coefficient, read from user data
TC2 = Syscheck2 temperature coefficient 2, read from user data

$$\mathrm{RL} = \underbrace{20 * log10(\mathrm{Vmeas}) \qquad [dBV]}_{\mathrm{SC\_level\_measured}}$$

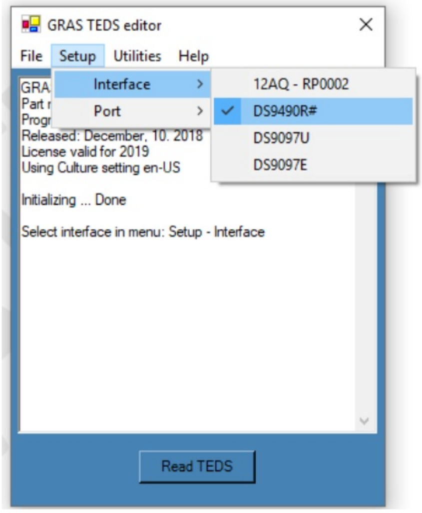
	sensTC	sensPC
246AE	-0.01	0.0014
246AO	-0.01	0.0007

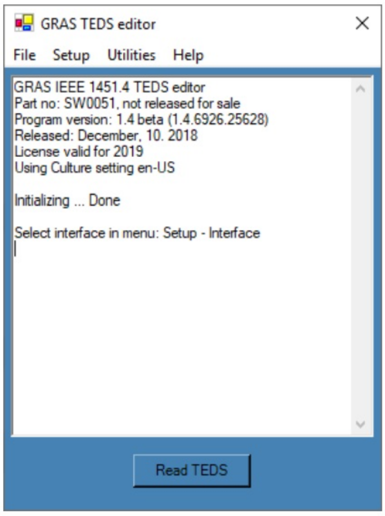
Environment correction coefficients, valid for 250Hz only.

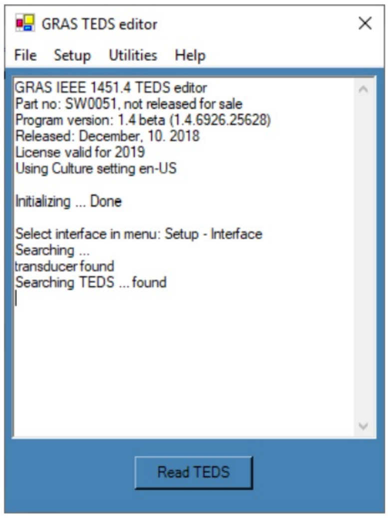
SC_level_corrected = SC_level_measured – ((t)2 * TC2 + t * TC – ((RT)2 * TC2 + RT * TC))

GRAS TEDS editor SW0051

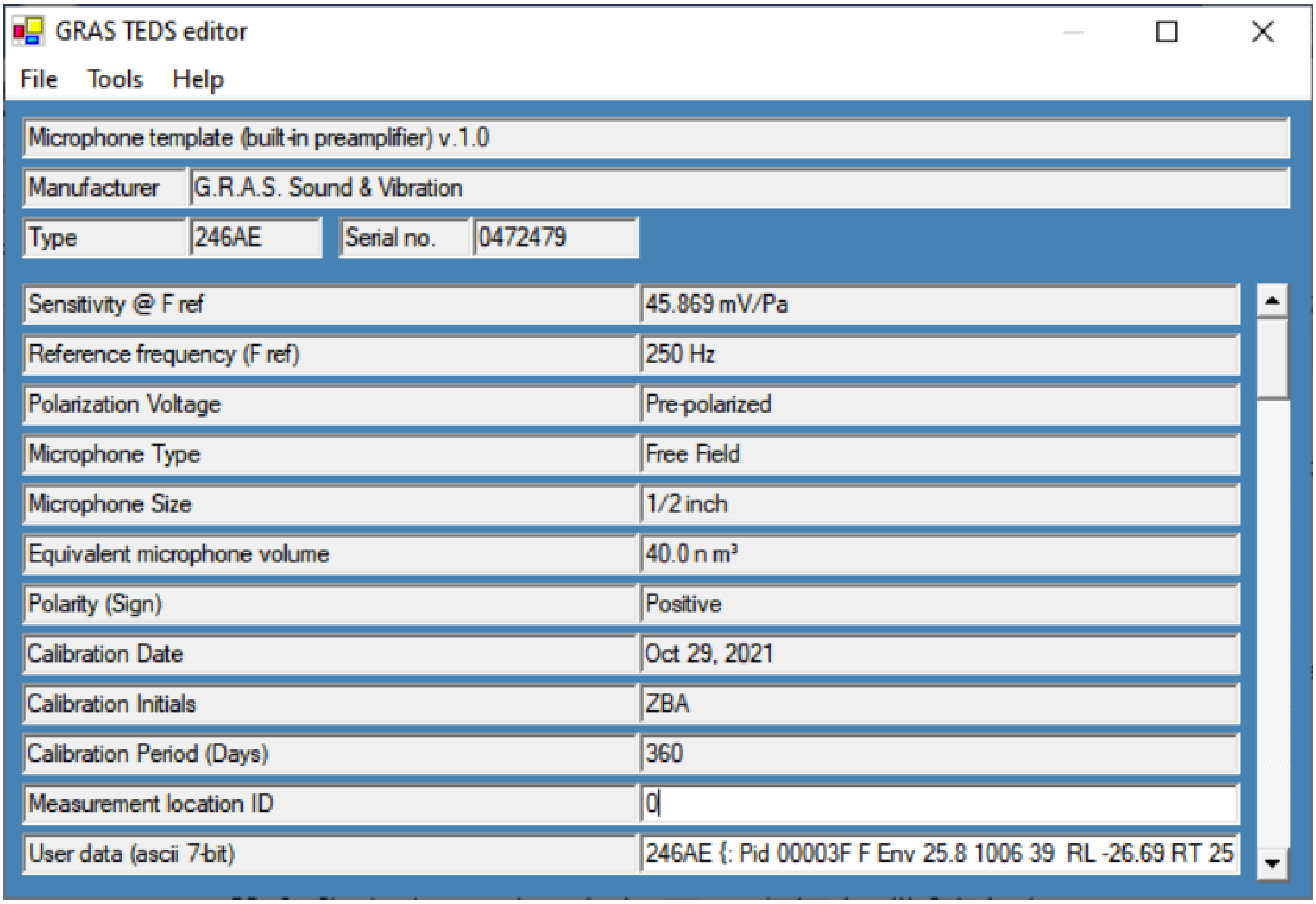
SW0051 is available as download on request.
After startup of editor, select interface and Read TEDS:



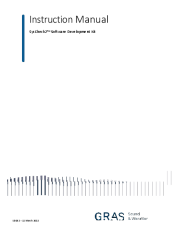




Example of TEDS with commands in user data:



Documents / Resources

	**GRAS 246AE SysCheck2 Software Development Kit** [pdf] Instruction Manual 246AE SysCheck2 Software Development Kit, 246AE, SysCheck2 Software Development Kit, Software Development Kit, Development Kit

References

- GRAS Sound and Vibration