



# **UWI-IQ**

## **Universal wireless interface in the band 868 MHz**

### **Universal wireless link UWI-IQ to UWI-IQ**

**DRAFT**

## Description

Universal wireless interface UWI-IQ can serve either as a node of the ICAS wireless IQ system with uCU-IQ control panel or two UWI-IQ units can be used for wireless link, which is independent on IQ system.

The communication protocol is compatible with the ICAS IQ system. The UWI-IQ is supposed to be powered from the device which is connected to or from uPU-IQ. There are wide possibilities of user configurations available, which allows to adapt the UWI-IQ to specific user application. The configuration is designed as wireless and user friendly special PC application - part of the RF monitor software tool, which serves for ICAS wireless system configuration and monitoring.

Wireless link is able to secure transmission of two input signals from one UWI-IQ unit by wireless to two relay outputs and loop option of the second UWI-IQ unit, which are configured into a wireless link. (peer to peer system configuration)

The UWI-IQ inputs are supposed to be connected to potential-free contacts and can be configured as NC or NO which is possible to set for each input individually.

(typically relay outputs of IRS-3 or control panels or open collector outputs possibly). The corresponded alarm/fault message is sent after the contacts connected to UWI inputs are switched on (NO config.) / switched off (NC config.). After its releasing/ connecting is sent the corresponded stop alarm/ stop fault message then.

UWI-IQ allows to indicate power supply on by green LED, activity on inputs and running pre-alarm (inputs delay) or outputs delay from the remote alarm/failure message by yellow and red LEDs - the red LED serves also for Test indication.

The next two LEDs serve for indication of received messages (remote events) at the same time with relevant outputs activity.

Fire ALARM relay is activated after receiving of the fire alarm message - the loop optional output will increase the current. The FAULT relay is activated after receiving of the fault message.

It is possible to set in UWI-IQ configuration the outputs / relays response also to local events and also it is possible to set delay of the output after alarm/fault message receiving.

If a control panel wired loop is connected to the UWI-IQ loop terminal instead of EOL resistor, the normal loop current flows through the UWI-IQ in normal condition. There are available two different levels of the normal loop current - corresponds to IMC-Mx panels or to IFP-2.32 panel. The switch on position J3 on the UWI-IQ Terminal board serves for an easy choice of the required normal loop current level.

The UWI-IQ will increase the loop current after the fire alarm message receiving to the fire alarm level, for the connected control panel.

The fault is indicated by interruption of the loop after fault message receiving - the loop current gets down and it will affect loop fault indication on the connected control panel.

(Typically application - transmission of FIRE ALARM and FAULT signals between two UWIs, - for example from remote IRS-3 aspiration detector to a standard ICAS control unit - IMC-MD, IFP2.32 etc.)

The same kind of UWI-IQ model can serve either as wireless transmitter or receiver or as a node of ICAS IQ system on the detector level.

UWI-IQ unit can serve also as an universal interface for ICAS IQ system with uCU-IQ control panel(s). In this configuration the UWI-IQ unit occupies one detector position in the system configuration.

There is an easy adjustable delay available for fire alarm and fault messages. After appearing of alarm condition on an input, the message is not sent immediately, but after a pre-alarm time. The alarm/fault is tested repeatedly with period about 4 s and only after the specified number of positive tests is reached, the corresponded message is transmitted.

The required pre-alarm period (input delay) is easy adjustable by user in steps about 4s. The easy way to set is to use the RF-monitor and set the required delay in the UWI-IQ configuration page.

The stop alarm/ stop fault messages are not delayed.

The UWI-IQ is able to send and receive both alarm and fault signals sequentially. In case the both alarm and fault signal are received, the both relays are activated and the alarm status has priority on the loop optional output.

It is possible to set also an output delay, which is an adjustable delay between receiving of the alarm or failure message and a correspondent output activities. This delay is user adjustable from the UWI-IQ configuration page of the RF - monitor.

## Testing & Delay setting.

The UWI-IQ can be tested by the TEST button. It is possible to test the radio-communication this way- short press of the test button evokes transmitting of the Tests / Reset message depends on current UWI-IQ status - normal / test mode.

The UWI-IQ gets from normal to test mode either by test button activity or after receiving of the test message from another component in wireless system configuration.

As soon as the Test mode is enabled, the outputs of the UWI-IQ unit will follow its inputs, which allows to test the hardware easy. The transmitting of alarm/failure messages is kept in the test mode too.

The test mode can be stopped by the Test button or by receiving of the reset message.

Test mode will be reset automatically in about 3 minutes if any reset message or button activity is not coming.

The response to the alarm/ fault events on UWI-IQ inputs can be delayed. The delay of the correspondent message sending is determined by number of input tests after the input signal level change from normal to alarm / fault condition.

The response to the alarm/fault disappearing (to the change of the signal level to normal level) is not delayed.

The default value of the delay is set to 2 (2 samples = 2 x 4s)

The delay (number of samples) is possible to change or check by PC with RF monitor software.

UWI-IQ allows an alternative set of a new input delay without PC assistance by a long press of the Test button. For the new delay set press the test button till appears the long yellow LED light and following required number of red flashes.

Every red flash during this set up routine means an incrementing of the number of signal samples between input change and message sending (Increasing of the delay with next 4s.)

You can check the current delay easy by an intended shortage of an UWI-IQ input and counting of flashes during the pre-alarm time.

The output delay is possible to set/change only from the RF-monitor, the default set is 0. If an output delay is set, the indication of the output delay will start after alarm/fault message receive by double flash of red or yellow LEDs (depends on received message F or E) with period about 4s. After the output delay time-out the double flashes stopped and UWI-IQ gets to the standard event indication and correspondent relay and loop output is activated.

## Terminal description:

**There are two terminal lines at the UWI-IQ -Term board.**  
(The terminals are marked directly by their function - the numbers used in this description are not on the PCB print)

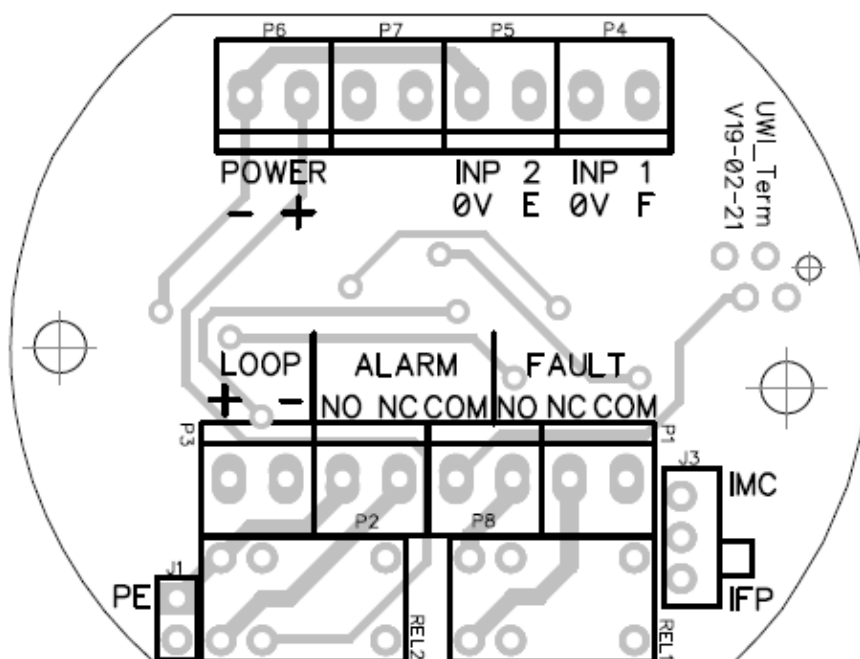
### INPUT terminal line:

1	- POWER	( 0V - power supply input)
2	+ POWER	9-12V DC - power supply input
3		
4		
5	INP 2 0V (Fault)	signal input pot.free contact or 0V for OC
6	INP 2 E (Fault)	signal input potential free contact or OC
7	INP 1 0V (Fire)	signal input pot.free contact or 0V for OC
8	INP 1 E (Fault)	signal input potential free contact or OC

3	ALARM / NO	relay contact
4	ALARM / NC	relay contact
5	ALARM / COM	relay contact
6	FAULT/ NO	relay contact
7	FAULT / NC	relay contact
8	FAULT / COM	relay contact

#### OUTPUT terminal line

- |   |        |  |
|---|--------|--|
| 1 | Loop + | optional output for control panel loop |
| 2 | Loop - | optional output for control panel loop |



## Installation

1. Configure wireless communication system with control panel or peer to peer loop (UWI-IQ to UWI-IQ link) before units placing (see Appendix 2 or 3 for details)
2. Connect the power supply (9-12V DC) to the terminals POWER
3. Do it for both UWI-IQ which should be configured in wireless link. In case of configuration UWI-IQ into uCU-IQ system connect also batteries to all wireless detectors in the system. During the start up time, the detector and UWI-IQ will give 2 short yellow blink every 4. sec. in 30 sec. (Do not forgot to Delete previously UWI-IQ configuration if any)
4. Follow the instruction from the manual for RF monitor - configuration software and configure wireless system or wireless link (UWI-IQ to UWI-IQ - peer to peer). (Wireless link is possible to configure the same way as peer to peer CHOR-IQ detector loop.)
5. Select the UWI-IQ for user configuration by RF -monitor, open the UWI-IQ configuration page and set the required UWI-IQ parameters like input delay, output delay, local relays response, response to Q message, Hush enable/disable. Choose the parameters in accordance to your intended UWI-IQ application. Set/check the configurable parameters of all UWI-IQ in installation /system.
6. Choose the best place to fix the UWI-IQ unit with regards to an easy connection with the source of the input signal and/or the receiver of relay / Loop output signals and power supply source. Find an optimal position especially with regards to the antenna. The antennas has to be oriented so that the same polarisation of all wireless components in system is secured. The UWI-IQ unit is possible to fix to a wall uCU-IQ alike. UWI-IQ is intended to be installed into an instrument distribution box. Install the UWI-IQ unit at least 0.5m from fuse box or other electrical appliances. Be aware that EM disturbances can harm the universal interface
7. Connect power supply wires and the input(s), outputs on the UWI-IQ terminal board according to the intended UWI-IQ application. Fix the

- UWI-IQ electronics into the plastic box and install the top panel. (Remove the top cover of the UWI-IQ carefully. Put a flat screwdriver to the left side of cover groove and slightly lever to left side and remove the top cover. Place the UWI-IQ in vertical position into instrument distribution box. Use 2 screws to connect both sides of the UWI-IQ to the box. Put the top cover of UWI-IQ backpanel.)
8. If external antenna is used, check carefully the antenna connection (correct coax connection of the pigtail on RM module and connection of the antenna to the pigtail by SMA connector.)
9. Check the Test broadcasting in the system. Test can be stopped by press of any UWI-IQ or detector test button or from the control panel. The test mode will stops automatically in about 3 minutes.

UWI-IQ custom configuration:

This feature allows to adapt the UWI-IQ to specific application.  
UWI-IQ is equipped by the special configuration register and by two delay registers, which are allocated in the EEPROM memory.  
The configurable parameters can be changed wireless from UWI-IQ configuration page of the RF-monitor PC tool.  
The following UWI-IQ parameters are configurable:

• <b>Input delay</b>	<b>255 steps ( one step is about 4s)</b>	<b>Default 2</b>
• <b>Output delay</b>	<b>255 steps ( one step is about 4s)</b>	<b>Default 0</b>
• <b>INP 1 (Fire input) level</b>	<b>Normal open / Normal closed</b>	<b>Default NO</b>
• <b>INP 2 (Fault input) level</b>	<b>Normal open / Normal closed</b>	<b>Default NO</b>
• <b>Q response</b>	<b>Disabled / Enabled</b>	<b>Default Disabled</b>
• <b>Hush response</b>	<b>Disabled / Enabled</b>	<b>Default Disabled</b>
• <b>Repeater</b>	<b>Disabled / Enabled</b>	<b>Default Disabled</b>

Input delay

If an input delay is set, and the UWI-IQ input level is changed from normal to active level, the alarm/fault message is not sent immediately , but only if the active level is kept during the pre-alarm / pre-fault indication period. The running pre-alarm period is indicated by flashes of correspondent LED (Red/Yellow) every delay step. If the input level is changed to normal during the pre-alarm, the pre-alarm indication stops and the delay counter value is renewed, so that for the alarm message is necessary to keep the input active for the whole pre-alarm delay against.

Output delay

If the message F or E is received and an output delay is set in the current UWI-IQ configuration, the outputs (relay and loop) will not get into alarm/fault state immediately, but after the configured delay period.

The running delay has been indicated by double flashes each delay step since the message has been received. When the button is pressed during the running output delay or RESET message or possibly Q message (if enabled) is received, no change of outputs come up and the delay and delay indication is reset.

INP 1, INP 2 level

As default the open input is evaluated by UWI-IQ as normal, whilst the closed input is considered to be alarm, resp. fault active signal.  
It is possible to set by the configuration option an individual input to be evaluated if closed (shorted) as normal and open (disconnected) input is evaluated as alarm/fault active signal then.

Q response

It is possible to enable in the configuration menu the response to Q-message. If Q response enabled the remote alarm/fault or running output delay are reset after Q message receiving (CHOR-IQ detector alike) If disabled the only possibilities how to stop the remote alarm (output activity) are Reset message or local button press.

Hush response

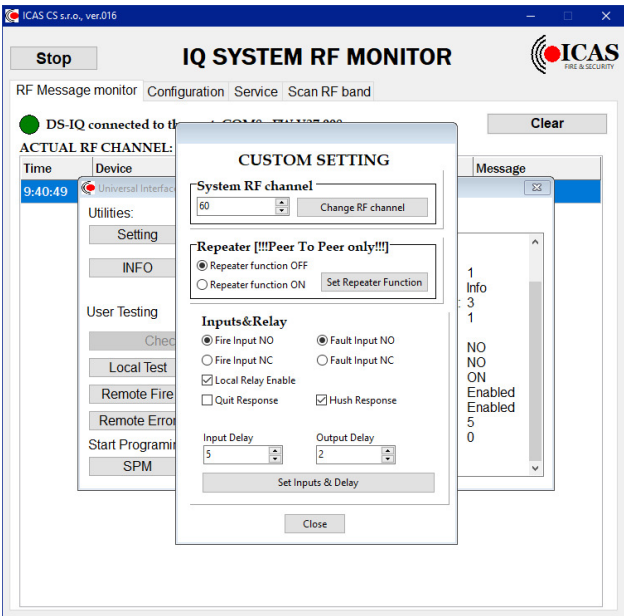
If Hush response enabled, a period, during which the UWI-IQ does not response neither to local input change nor to remote alarm / fault message can be started . It will start either after H message receiving or when the button is pressed till red led TEST gets dark against.

Repeater

If this optional feature is enabled, the UWI-IQ is also forwarding the received messages. This option is available only for peer to peer system configurations.(In system configuration with control panel uCU-IQ serves Repeater-IQ for possible message forwarding. )

Example of a configuration screen and customer setting:

(Inputs are opened in normal condition, ALARM or FAULT can be activated shortage of the INP1 or INP 2)  
(Q response is suppressed, Relays and loop output will response also to local events and Hush can be activated either by button or by instruction. )



## Test

Press the test button shortly (till red led TEST gets on) - the UWI-IQ gets into the test mode, red LED indicates Test and the message 'T' is sent to other nodes.

As soon as the other UWI-IQ in the wireless link or other UWI-IQ and CHOR-IQ detectors into the wireless system receive this message they will get into the test mode too.

The further short press of the test button will stop the Test mode and Reset message 'R' is sent to stop Test mode in remote nodes of system.

The test mode will stopped also when R message has been received or automatically after about 3 minutes.

## Diagnostic mode - hardware tests.

Press the button as long till both red and yellow LEDs are lighting together.

The diagnostic mode is indicated by periodical flashes of red and yellow LEDs at the same time

Local alarm/fault will activated local Loop output and ALARM/FAULT relay regardless the configuration set in diagnostic mode.

Press the button shortly for diagnostic mode stop.

## Power supply

The UWI-IQ unit is supposed to be powered through the POWER terminals +/- from an external power supply (in case of the UWI-IQ to UWI-IQ link it is powered mostly from the control panel or IRS-3 which is the UWI-IQ connected to). If the UWI-IQ unit is used as a node of the system with uCU-IQ, the uPU power supply can be used also for UWI-IQ energizing. The power supply is indicated by green LED on the UWI-IQ panel

The power supply voltage loss will be indicated by switch off of the green LED on UWI-IQ panel and after communication test period expiration also as a communication fault on uCU-IQ control panel.

## Software description:

The UWI-IQ unit is controlled by ICAS software application which is installed into the ATTINY44A, this software has been designed in ATMEL assembler language and cooperates with the second ICAS application software which is designed in C language and programmed into IQRF radio-module and on background of this application is running the IQRF OS. The UWI-IQ takes advantage of use of the same application software of IQRF radio-module. The ATTINY software controls the timing of processes and switch between standby mode with very low current consumption and active mode which is activated periodically by watchdog wake up technique.

## Advanced Digital Signal-filtration (ADS)

The UWI-IQ software solution guarantees a correct signal handling and reduce nuisance of false alarms and give improved immunity against EM noise. In case of important events, i.e. alarms and faults, can be the UWI-IQ input signals tested repeatedly in queue of samples which number is possible to set by configuration option and the alarm or fault is indicated only if all samples in queue are tested as active. If any sample in this pre-alarm period is tested as normal, the number of tested samples in queue is reset. (Default set is 2 samples)

The optional delay between received message and relevant output change can be set in addition. The receiving message is indicated during the running delay period and allows possible action of the user before UWI-IQ outputs activation. (Default set is 0)

## The software of the interface microcontroller serves for following tasks:

- input signal processing (digital filtering) - the similar signal filtration as in ICAS CHOR-IQ is used
- update of two status words - the first serves for the internal interface status, the second one for the loop status
- generation of the output message for wireless loop depends on actual interface status
- wake up of the radio-module and control the data /message/ exchange between radio-module and interface
- SPI master for communication between radio-module and the in built interface microcontroller
- received message analysis and loop status word update
- indication of the UWI-IQ status
- indication of the link status - remote events indication by LEDs, relays and Loop output control
- test processing and indication
- memory check and system error indication
- pushbutton interrupt processing and intelligent response to pushbutton activity which depends on current detector and loop status
- input delay adjustment (filtering set)

## The software of the radio-module serves for the following tasks:

- Operation for joining or deleting from the specific loop, loop creating - learn mode indication
- Wake up from the SPI master and communication in SPI SLAVE mode with UWI-IQ interface (the new message is sent from radio-module into the interface and a new message from the interface is sent into the radio-module at the same time)
- Timing of transmitting time slots for wireless communication depends on its loop number in order to avoid communication collisions in one loop
- Transmitting of the message from the interface into the loop or to the IQ control panel (depends on IQ System configuration)
- Loop Message monitoring, processing and selection (the message from the loop is not automatically sent directly to the UWI-IQ)

## Indication

There are one green, two red and two yellow LEDs for indication on the panel.

The green LED (POWER) serves only for the power supply indication.

Red LED (LOCAL ALARM/TEST) it serves for indication of the local pre-alarm by flashing and following steady indication of full local alarm  
it serves for the indication of the output delay after receiving of the F message (before Fire output activation)  
it serves also for indication of TEST mode after receiving of T message or after TEST button short press  
it serves also for indication of the new input delay, during manual delay adjustment procedure

Yellow LED (LOCAL FAULT/HUSH) it serves for indication of pre-fault by flashing and following full indication of local fault  
it serves for the indication of the output delay after receiving of the E message (before Fault output activation)  
it serves for indication of start up time and manual reset acceptance  
it can serve optionally also for indication of any local internal UWI-IQ fault

Red LED (REMOTE ALARM) it serves for indication of received F message (the relay FIRE and LOOP output get into ALARM state)  
it gets dark after receiving of S or R messages or after Q message if enabled

Yellow LED (REMOTE FAULT) serves for indication of received E message (the relay FAULT and LOOP output get into FAULT state)  
it gets dark after receiving of C or R messages (if both F and E message are received, the LOOP will be in FIRE state, the both relays FIRE and FAULT will be activated) It can get dark even after Q message if enabled

#### UWI-IQ indications:

Signal-colour	Signal-type	Status UWI-IQ	Action / Comments
Green	Steady	Power on	
Red (LOCAL ALARM / TEST)	Flash every 4. sec.	Pre-alarm period / Input 1 in active state Delay of signal from Input 1 is running	Number of consequently input samples on INPUT 1 which are necessary for the full ALARM has not been reached, but the sample/samples with alarm level has been already detected. Number of samples N is adjustable. Default set of N is 2. (The specified delay is used for both ALARM and FAULT input delays).
Red (LOCAL ALARM / TEST)	Steady (after flashing)  Steady	Fire alarm / Input 1 in active state  Test mode indication	Number of consequently alarm samples, which are necessary for alarm on INPUT 1 has been reached.  Test button was pressed shortly or T message received/ - Press the pushbutton shortly to TEST stop, the detector gets into NORMAL and (R) message will be sent - The TEST will be stopped after receiving of (r) message - If no button or (r) message stops the test, the test mode will be stopped automatically in about 3 minutes (No message is sent)
Red (LOCAL ALARM / TEST)	Double flashes	Output delay is running (F message has been received)	When the F message is received, the relay ALARM and Loop output will get into alarm condition after number of 4s periods, which are set as OUTPUT DELAY. If the R message is received or pushbutton pressed shortly during the running delay, the delay is reset and the outputs will not be activated. (Default set of the OUTPUT DELAY is 0 (In this case the output delay is not indicated and the outputs get into alarm state immediately after F message receiving.)
Yellow (LOCAL FAULT / HUSH)	Flash every 4. sec.	Pre-alarm period / Input 2 in active state Delay of signal from Input 2 is running	Number of consequently input samples on INPUT 2 which are necessary for the full FAULT has not been reached, but a signal sample/samples with fault level has been already detected. Number of samples N is adjustable. (The specified input delay N is used for both ALARM and FAULT inputs). Default delay set is 2
Yellow (LOCAL FAULT / HUSH)	Steady (after flashing)	Fault alarm / Input 2 in active state	Number of consequently active input samples on INPUT 2 which are necessary for full FAULT has been reached.
Yellow (LOCAL FAULT / HUSH)	Triple flash periodically	HUSH period is running	
Signal-colour	Signal-type	Status UWI-IQ	Action / Comments
Yellow and Red (LOCAL ALARM / TEST) + (LOCAL FAULT / HUSH)	Flashing of both LEDs together periodically	Diagnostic mode	Local alarm/fault will activated local Loop output and ALARM/FAULT relay regardless the configuration set.

#### Radio module - indications and control:

(Two indication LEDs for radio-module and radio-module pushbutton are located on positions D10, D11 and TL2 (RM) and visible after cover opening)  
The RM button is the button at right, which is possible to press by a suitable tool. Two openings for radio-module LEDs are placed above RM

Signal-colour	Signal-type	Radio module status indication	Action / Comments
Yellow	Flash (100ms) every 4s	- Loop learning operation mode - Not added into loop	- Message L was received - Detector is not added into loop - Press and hold RM until Yellow indication is blinking and release RM
	Blinking with 500ms period	- Loop learning operation mode - Button RM is pressed and hold	- Button RM is pressed and hold - RF module received message L before - Release button RM - Confirmation message K is sent - Indication is changed to RED flashes
	1x Short Flash (100ms) followed 1x Long Flash (500ms)	- Button RM is pressed and hold - Loop learning operation mode will be run after button release	- Button RM is pressed and hold - Release button RM to run loop learning mode – L message is sent - Hold RM and wait until indication is changed at Red long Flash and Yellow Long Flash - Release button RM to send delete message D – detector is removed from the loop
Red	Flash (100ms) every 4s	- Loop learning operation mode - Detector added into loop	- Message L was received - Detector is added into loop
Red + Yellow	1x Long Red Flash (500ms) followed 1x Long Yellow Flash (500ms)	- FACTORY RESET - Button RM is pressed and hold - Detector will be deleted from the loop after button release	- Button RM is pressed and hold - Release button to transmit delete message D and delete detector from the loop - Module is back to FACTORY MODE, and able to be programmed.

#### (TEST / RESET) button - User friendly Push-button operation

The UWI-IQ is trying to estimate the user intention and if the UWI-IQ is in other status than normal a simple short press and release of the detector button can be the first easy solution of the most UWI-IQ/loop situation like TEST indication, HUSH indication or a remote alarm/fault indication etc.

UWI-IQ status	Push button activity	Results - new detector state	Output message to the SPI / loop
Normal	Short press and release	Test mode, T message	T
Test	Short press and release	Normal, R message	R
Output delay running	Short press and release	Delay reset, The received Remote ALARM/FAULT message will not effect the UWI-IQ outputs	-
Remote Alarm	Short press and release	Normal	Q
Remote Fault	Short press and release	Normal	Q
HUSH	Short press and release	Normal	-
Diagnostics mode	Short press and release	Normal	-
Normal	Press until Red LED (LOCALALARM/TEST) gets on and darks	HUSH / If HUSH response is enabled in configuration Normal / If HUSH response is disabled	- R
Normal / x	Long press until Yellow Led flashes once and gets on	RESTART	X
Normal / x	Long press until Yellow LED (LOCAL FAULT / HUSH) gets lit together with Red LED (LOCALALARM/TEST)	DIAGNOSTIC mode (after restart)	X
Normal / x	Long press until Yellow and Red Leds get dark after their common lit and the red led starts flashing	Number of red flashes before releasing of the button is a new set of the input delay set	

#### Maintenance

The UWI-IQ interface shall be maintained with regularity, do the test by Test button monthly in order to check the communication to second UWI-IQ or to configured uCU-IQ system..

Test adjusted delay by simulated alarm/fault on interface input by activation of the tested input

Test outputs response by alarm/fault on interface input by activation of the tested input(s) in Diagnostic mode and check the correspondent relay output change and loop response. (It is not necessary to use Diagnostic mode, if Local outputs response is enabled in configuration)



## **Technical specification:**

Type:	<b>UWI-IQ</b>		
Software:	UWI V40.009 & IQRF V41.002/OS4.00		
Purpose:	Transmission of two input signals from one UWI-IQ by wireless to two relay outputs and loop option of the second UWI-IQ unit, which is configured into the wireless link (peer to peer) or to uCU-IQ system by compatible communication protocol and messages.		
Wireless communication:	868 MHz band, recommended channel in the range from 56 to 60 UWI-IQ wireless loop (PEER to PEER net) or configuration into a system with the wireless control panel µCU-IQ (STAR net wireless system configuration) ICAS wireless communication protocol, zone supports, ICAS MASH architecture support, compatible with µCU-IQ, certified IQRF radio-module compatible to RF monitor PC tool for configuration and monitoring variants with internal or external antennas		
Recommended ext. antenna:	868 MHz 5dBi whip		
Power:	External power supply voltage in the range from 9V to 24V DC		
Current consumption standby:	< 5 mA (Normal - only green Led indication)		
Max. current consumption:	< 90mA (Test mode+local alarm +local fault -all leds lighting, both relays on and loop output in fire alarm)		
Testing	ByTest/Reset push-button - the short press from Normal will trig a TEST mode - Test Leds is lighting ,test message (T) is sent by SPI and forwarded by the radio-module. The radio-communication range can be tested this way By long press of the TEST/RESET push button / till lit of both red and yellow at the same time/ set Diagnostic mode and Local Alarm/Fault will control in Diagnostic mode also the unit outputs /relays and loop output/. The inputs and outputs response can be tested without radio-communication or without configuration into a system this way		
Delay/input filter:	Adjustable delay - pre-alarm period in steps 4s, default set is 2 samples of pre-alarm.		
Output delay	Adjustable delay from alarm/fault message receiving to outputs activation in steps 4s (default set is 0)		
Configuration into system :	By the RF monitor V.16 and higher ( PC application) and DS-IQ module		
Configurable parameters:	By the RF monitor PC tool (UWI-IQ Setting page)		
	Input delay	255 steps ( one step is about 4s)	Default 2
	Output delay	255 steps ( one step is about 4s)	Default 0
	INP 1 (Fire input) level	Normal open / Normal closed	Default NO
	INP 2 (Fault input) level	Normal open / Normal closed	Default NO
	Q response	Disabled / Enabled	Default Disabled
	Hush response	Disabled / Enabled	Default Disabled
TEST / RESET button:	Serves for control of TEST, RESET, RESTART, HUSH, DIAGNOSTICS mode and INPUT DELAY set (without PC tool)		
Temp. :	-10 °C to +55 °C		
Humidity:	95%RH (No condensation)		
Size (without ext. Antenna):	85 mm x 85 mm x 43 mm		

<b>Indications: Interface STATUS</b>	<b>INDICATION:</b>	<b>SPI</b>	<b>RADIO</b>
Start up time:	starts by 4 x Yellow LED flash and continue by Yellow double flash every 4 sec Increment Start counter in EEPROM	'X'	Identification
Normal condition:	standby current consumption - only green LED (POWER) lighting	'N'	-
Test:	Start by Test button or by 't' message RED Led (LOCAL ALARM / TEST) Stop by Test button, by 'r' message or automatically after 2 minutes	'T'	'T'
INPUT1 = (Local pre-alarm):	Red LED (LOCAL ALARM / TEST) flashes every positive input test - 4s period (during pre-alarm protective period - input delay only)	-	-
INPUT1= (Local FIRE ALARM):	Red LED (LOCAL ALARM / TEST) is lighting Alarm counter is incremented in EEPROM and the Event is recorded	'F'	'F'
INPUT1 change from Alarm to Normal	after disappearing of fire condition signal on INPUT1 is sent one stop message (the stop message will send if only the full alarm was reached before)	'S'	'S'
INPUT2 = (Local pre-fault):	Yellow LED (LOCAL FAULT / HUSH) flashes every positive input2 test - 4s period (during pre-fault protective period - input delay only)	-	-
INPUT2 = (Local FAULT):	YELLOW LED is lighting Alarm counter is incremented in EEPROM and an Event is recorded	'E'	'E'
INPUT2 change from Fault to Normal	after disappearing of FAULT condition signal on INPUT2 is sent one stop message (the clean message will be send if only the full fault was reached before)	'C'	'C'
Program hangs:	Watch-Dog RESET 4 flashes by Yellow LED every WD reset WD counter in EEPROM increment	'X'	Identification
Remote ALARM received:	Starts by 'f' message - RED LED (REMOTE ALARM), Fire RELAY on, and loop output in fire condition (increased current of the loop to alarm value) until receiving of stop alarm (s), reset (r), quit (q)_ if enabled or hush (h)_if enabled message or quit by a short TEST /RESET button press. If output delay is set, the Red Led (LOCAL ALARM / TEST) is double flashing during the delay first.	'f'	'F'
Remote FAULT received:	Starts by 'e' message - YELL LED (REMOTE FAULT) ,Fault RELAY on, and loop output in fault condition (decreased loop current to fault limit) until receiving of stop fault (c), reset (r), quit (q) if enabled or quit by a short Test button press If output delay is set, the Red Led (LOCAL ALARM / TEST) is double flashing during the delay first.	'e'	'E'
Remote Test	Indication by RED LED ALARM/TEST automatic recovery after about 2 min	't'	'T'
Quit:	Message 'q' stops all remote indications (cancel an actual remote alarm or remote error) this operation can be activated by Test push button on any node in remote alarm or from a control panel. Acceptation of Q message by UWI-IQ depends on configuration, The Q response must be enabled (Disabled as default) the local alarm is kept – it allows to find (localize) node with local alarm/local error (If the button of node with local alarm is used the all detectors will stop sirens)	'q'	'Q'
Reset:	By the push button from the Test mode or by the message 'r' It clears the UWI-IQ indications and status words – the local alarm, local fault, remote alarm, remote error (Reset can be applied even in local alarm /fault condition, but the Interface will indicate the pre -alarm and alarm or pre-fault and fault condition against then)	'r'	'R'
Restart:	the Interface is restarted the same way as after a power voltage on Restart can be done by power voltage ( <b>off /on</b> ) sequence or by a long push of the detector button or	'X'	Identification

**SPI message structure and instruction set (the same structure and instruction set is used for both ICAS wireless system or OEM system)**

#### SPI message structure:

// CMD // PTYPE // DATA\_1 // DATA\_2 // DATA\_3 // DATA\_4 // CRC// where

CMD = F0 ..... Data read/write operation code

PTYPE = 84 ..... code for full duplex communication 80+ data block length

DATA_1 = master data - actual chamber value *	/	slave data - source component ID number **
DATA_2 = master data - average chamber value *	/	slave data - source subloop ID number **
DATA_3 = master data - status byte of the detector*	/	slave data - source zone ID number **
DATA_4 = master data - detector info (ASCII code upper case )	/	slave data - loop info (ASCII code - lower case)

CRC = ((CMD) xor (PTYPE) xor (DATA\_1) xor (DATA\_2) xor (DATA\_3) xor (DATA\_4) xor (5F)) for the master message

CRC = ((PTYPE) xor (DATA\_1) xor (DATA\_2) xor (DATA\_3) xor (DATA\_4) xor (5F)) for the slave message

\* these data are not broadcasted by IQRF radio-transceiver

\*\* these data are not evaluated by the detector / serves for control panel operations

The Interface microcontroller serves as the SPI master for a communication between the IQRF radio-module and the in built Interface microcontroller. The SPI slave (radio-module) is waken up periodically and the message from SPI master to SPI slave and from SPI slave to SPI master are exchanged at the same time. The SPI message includes 4 data bytes due to compatibility of the protocol with µCU-IQ, but for the Interface is mostly important the last data byte only, on this data position is sent a code which informs about Interface events and received code with information/instruction from the SLAVE module (loop info). If instruction code is 'w', the other bytes are used for UWI-IQ configuration:

- the first byte is interpreted as the new input delay
- the second byte is interpreted as the new output delay
- the third byte is interpreted as a new configuration byte CFG with following meanings of single bits:

CFG Configuration byte structure:

FIN	ALARM INPUT CONFIGURATION	- 0: NO - input active if closed	/// 1: NC - input active when open
EIN	FAULT INPUT CONFIGURATION	- 0: NO - input active if closed	/// 1: NC- input active when open
REL	Outputs response to local events	- 0: response only to remote events	/// 1: response to local or remote alarm/fault
QRE	Q Response	- 0: Q response is blocked (default)	/// 1: response to Q instruction enabled
RFT	special RF communication test - not applied	(the compatible standard communication test is solved in the system with uCU-IQ )	
HRE	H Response	- 0: HUSH function is disabled	/// 1: HUSH function and response to H enabled
x			
x			

#### **ICAS instruction set (ASCII code interpretation):**

##### Code set transmitted by UWI-IQ interface (by MASTER)

code	detector status
F	local fire alarm info
S	stopped local fire alarm info
E	detector /chamber/ error info
C	stopped error or low battery info
Q	request to stop all remote events indications
T	test request
R	loop reset request
N	no significant event
X	info about RESTART
Z	data after w directive was not accepted

##### Code set accepted from SLAVE (from the radio-module) and evaluated by Interface

code	code interpretation
f	request for remote alarm indication
s	request for remote fire alarm indication stop
e	request for remote error indication
c	directive to suppress the remote error , low batt and com. lost indication
q	directive to stop all remote evens indication incl. remote alarm)
w	instruction before special EEPROM update operation
r	RESET directive - stop all detector indication of both remote and local events (the detector in the alarm condition gets into hush first)
i	request for basic detector status info
k	request for communication lost indication
x	for detector RESTART

Additional codes which are used for communication

L  
D  
K

#### **Appendix 1**

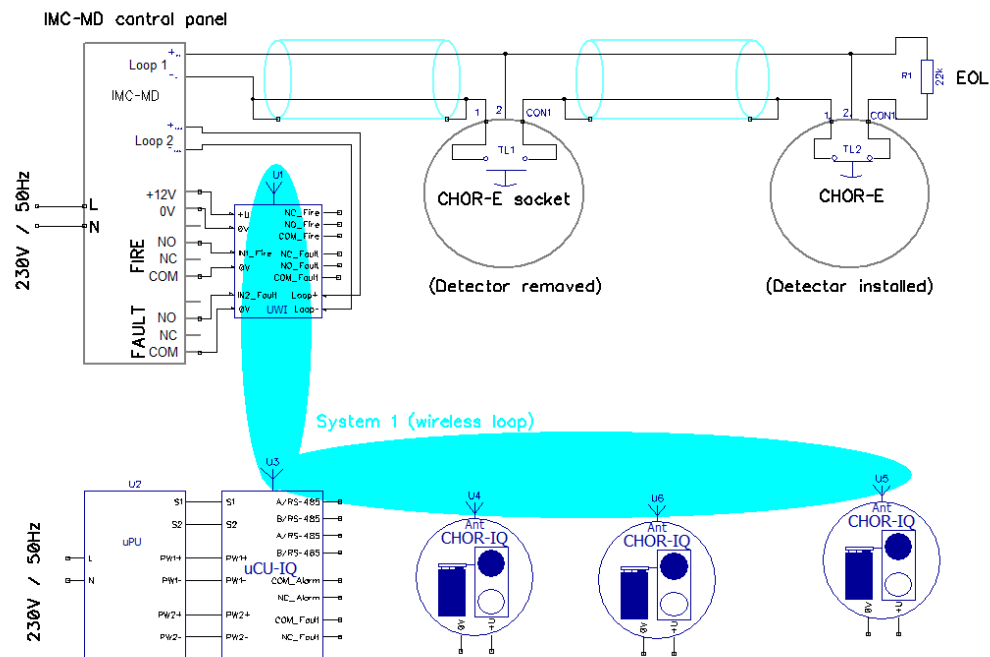
##### SPI IQRF compatible protocol description

#### **Appendix 2**

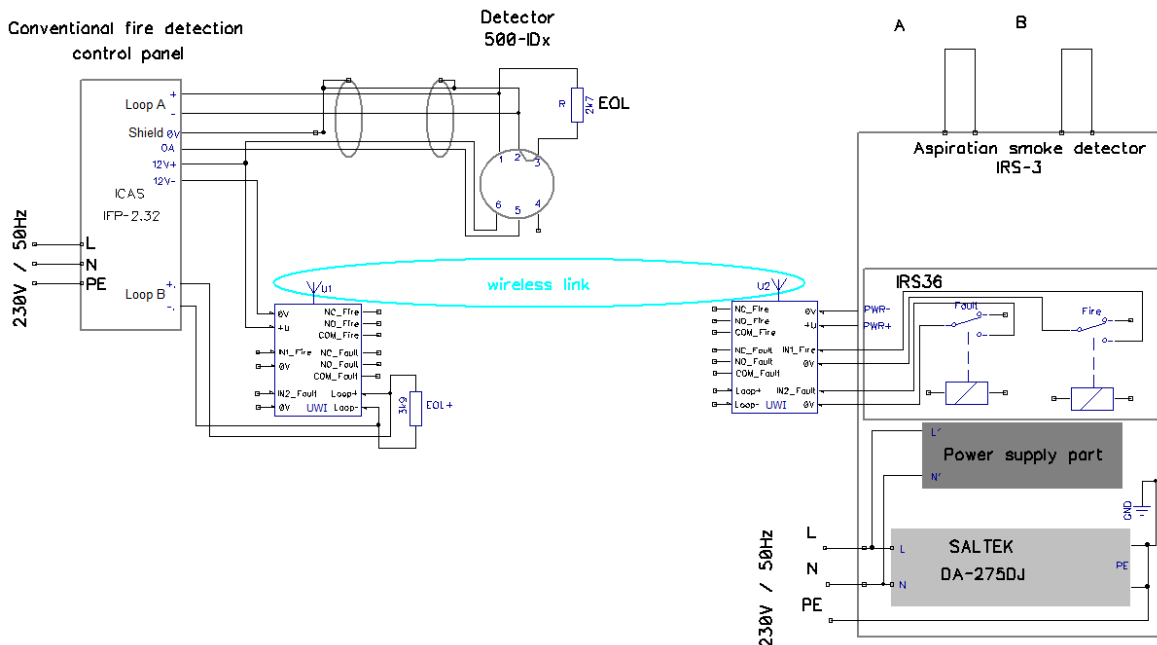
##### ICAS IQ wireless system configuration

/ LEARN/ DELETING from the LOOP or sub-loop/ Creating the wireless PEER to PEER loop / Zone configuration/

Example of wireless connection of the wired system IMC-MD to uCU-IQ system by UWI



The IMC-MD system is wireless connected by UWI as one detector/node into uCU-IQ system (another CHOR-IQ alike)  
The Fire alarm or Fault of the uCU-IQ is indicated also in IMC-MD system as Fire/Fault in the Loop2



ICAS conventional pane IFC-2.32 and IRS-3 wireless connection by UWI with fire and fault indication in the loop B.

(There is the optional relay board IRS36 for a loop fault indication necessary)

EOL+ is used for IFC-2.32, do not add it in case IMC-MD is used as control panel

Notice : (The resistor 3k9 EOL+ is not necessary more)

The switch at the position J3 on the terminal board allows to choose between IFC and IMC control panels and the loop current is switched to a correspondent standby level automatically at the same time.)