Short technical description: INT-RS v1.19 2023-02-22, INT-RS Plus v2.21 2023-02-22 and ETHM-1 v1.07 2015-03-02 / ETHM-1 Plus v2.05 2018-01-11

The INT-RS module is an INTEGRA LCD-bus to RS-232 converter. It is dedicated to work with INTEGRA v1.21 2023-02-21 or newer. The ETHM-1 module converts INTEGRA LCD-bus to Ethernet network - its protocol is described in *Function 2* chapter.
INT-RS Plus is 100% backward compatible with INT-RS.
Further in the document the name INT-RS will be used both for INT-RS and INT-RS Plus.

To properly configure INT-RS module with INTEGRA panel, the following steps should be done:

1) Set the module address using DIP-switches 3..1 (3-MSB, 1-LSB). Allowed addresses are:
   - 0..3 - for INTEGRA 24 and 32 (i.e. DIP3='OFF')
   - 0..7 - for INTEGRA 64, 128, 128-WRL, 64 Plus, 128 Plus and 256 Plus

   E.g. to set the 6 address = 110_{bin}, the DIP-switches should be moved to: DIP3='ON', DIP2='ON', DIP1='OFF'.
2) Set the module function using DIP-switches 8..4 (8-MSB, 4-LSB). Possible values are 0 to 31 = 00000_{bin} to 11111_{bin}, but only the first few functions are present (see description below).
3) Connect INT-RS module to INTEGRA LCD bus using 4-wire cable.
4) Enter the service mode, go to the *Structure* menu -> *Hardware* menu -> *Identification* menu -> *LCD keypads id.* function.

For more details refer to INTEGRA manuals.

Function 0 - DIP-switches 8..4 = 00000

The module RS-232 port acts as INT-KLCD keypad serial port. For details refer to **INT-KLCD eng.pdf** document.

Function 1 - DIP-switches 8..4 = 00001

The module is used by INTEGRA panel for the monitoring purposes. To activate monitoring through INT-RS module, set the *Mon.ETHM-1* option in panel service settings.
If the system contains ETHM-1 modules and INT-RS modules with function 1, setting the *Mon.ETHM-1* option will allow to monitor events only by one of these modules - the one with the lowest address (e.g. the system contains modules: ETHM-1 address 5, INT-RS with function 0 address 1 and INT-RS with function 1 address 3 modules. Monitoring will be processed only through INT-RS with function 1 address 3 module).

RS-232 serial port of INT-RS module is configured as 4800/8/1/N. The DB9-male connector on the PCB uses the following lines:

- RX (pin 2) - serial input
- TX (pin 3) - serial output
- DTR (pin 4) - output - active when INT-RS module has communication with INTEGRA
- GND (pin 5) - signal ground
- DSR (pin 6) - input - the module can use this signal only to generate 'No external device DTR signal' event

The GND lines between INT-RS module and external device must be tied together.
The RX and TX lines should be swapped.
The DTR and DSR lines should also be swapped, if they are used.
In INTEGRA service mode it can be set that INT-RS module does or does not generate 'No external device DTR signal' event. It can also be set that INT-RS module does or does not check '?',#13 command (see below). If set, a monitoring trouble arises if external device does not ask INT-RS with '?',#13 question for a time longer that 32 seconds.

Communication between INT-RS module and external device is arranged is such a way that external device should ask INT-RS module to check if a new event is ready to be send to a monitoring station. All data are ASCII chars ended with CR char (#13 = 0x0D byte). Data exchange is no time dependent.
Commands that INT-RS module understands:

- '?',#13 - a question if a new event is ready (2 bytes: 0x3F, 0x0D)
- '+',m,#13 - confirmation of sending event with marker m (3 bytes: 0x2B, m, 0x0D)
- '-',m,#13 - error sending event with marker m (3 bytes: 0x2D, m, 0x0D)

An answer is returned only on '?',#13 question. Possible answers are listed below:

- 'OK',#13 - no new event to send
- 'EN=m,s,iiii,cc'#13 - 4/2 event to sent: m - event marker, s - monitoring station number ('1' or '2'), iiii - event identifier, cc - event code
- 'EC=m,s,iiii,q,ccc,pp,nnn'#13 - Contact ID event to send: s - monitoring station number ('1' or '2'), m - event marker, iiii - event identifier, q and ccc - event code, pp - partition number, nnn - source number

Events format and what events should be sent (4/2 or Contact ID) are to be set in INTEGRA service mode.
Event marker m is a char between 'a' and 'z'. The current event and its marker remain unchanged upon successive '?',#13 questions, until the event is confirmed by '+',m,#13 command from the external device or if INTEGRA time-out occurs (75 seconds). The next event, if ready, will be submitted by INT-RS module with succeeding value of marker m.

Function 2 - DIP-switches 8..4 = 00010

The module is used by INTEGRA panel for integration purposes. The same protocol is used by ETHM-1 module - see it below.
INT-RS Plus v2.xx can be used with any INTEGRA model, INT-RS v1.xx can be used with any INTEGRA except 256 Plus.
Using INT-RS v1.xx with INTEGRA 256 Plus results in limitations on zones, outputs and troubles.

RS-232 serial port of INT-RS module is configured as 19200/8/1/N. The DB9 connector uses the same lines as in Function 1.

Communication between INT-RS module and external device is arranged is such a way that external device should ask (send command to) INT-RS module, and the module will answer immediately, if it is not marked otherwise.

Data exchange is no time dependent. The protocol uses the following frame structure (both ways - from and to INT-RS):

0xFE	0xFE	cmd	d1	d2	...	dn	crc.high	crc.low	0xFE	0x0D

The 16-bit crc sum is calculated as follows (see Appendix 4):

1) Set crc := 0x147A
2) For all successive bytes b = cmd, d1, d2, ..., dn perform the crc update steps:
   a) crc := rl(crc) - rotate crc 1 bit left (msb=bit.15 shifts into lsb=bit.0 position)
   b) crc := crc xor 0xFFFF
   c) crc := crc + crc.high + b, e.g. if crc=0xFEDC and b=0xA9 then: 0xFEDC + 0xFE + 0xA9 = 0x0083

The 0xFE byte is special value:

1) Two (or more) successive 0xFE mean frame synchronization - i.e. if device waits for any data-frame byte and it receives 0xFE, 0xFE - it should interrupt collecting the current frame and start waiting for cmd.
2) If device is waiting for the 1*st* byte of a frame (i.e. waiting for cmd), receiving 0xFE should not change it - device should be still waiting for cmd. So, cmd can not be 0xFE.
3) If any byte of the frame (i.e. cmd, d1, d2, ..., dn, crc.high, crc.low) to be sent is equal 0xFE, the following two bytes must be sent instead of single 0xFE byte: 0xFE, 0xF0. In such case only single 0xFE should be used to update crc.
4) If 0xFE, 0x0D are received, it means the frame is completed and it can be processed - i.e. check crc and analyze.
5) If other value after 0xFE is received - treat it as 0xFE, 0xFE (i.e. treat it as synchronization sequence).

If frame is corrupted (i.e. wrong crc sum or interrupted by 0xFE, 0xFE before completed) or cmd is not know or data length is not suitable for cmd - it is dropped and no answer is given back. **External device should act the same way.**

Exemplary frames: FE FE 09 D7 EB FE 0D FE FE 1C D7 FE F0 FE 0D

Part 1 - Reading INTEGRA state:

cmd	meaning	answer
0x00	zones violation	0x00 + 16/32 bytes (*) (e.g. 04 20 00 00 00 00 00 00 00 00 00 00 00 00 00 80 - zones 3, 14 and 128)
0x01	zones tamper	0x01 + 16/32 bytes (*)
0x02	zones alarm	0x02 + 16/32 bytes (*)
0x03	zones tamper alarm	0x03 + 16/32 bytes (*)
0x04	zones alarm memory	0x04 + 16/32 bytes (*)
0x05	zones tamper alarm memory	0x05 + 16/32 bytes (*)
0x06	zones bypass	0x06 + 16/32 bytes (*)
0x07	zones 'no violation' trouble	0x07 + 16/32 bytes (*)
0x08	zones 'long violation' trouble	0x08 + 16/32 bytes (*)
0x09	armed partitions (suppressed)	0x09 + 4 bytes (see the note below)
0x0A	armed partitions (really)	0x0A + 4 bytes (see the note below)
0x0B	partitions armed in mode 2	0x0B + 4 bytes
0x0C	partitions armed in mode 3	0x0C + 4 bytes
0x0D	partitions with 1*st* code entered	0x0D + 4 bytes
0x0E	partitions entry time	0x0E + 4 bytes
0x0F	partitions exit time >10s	0x0F + 4 bytes
0x10	partitions exit time <10s	0x10 + 4 bytes
0x11	partitions temporary blocked	0x11 + 4 bytes
0x12	partitions blocked for guard round	0x12 + 4 bytes
0x13	partitions alarm	0x13 + 4 bytes
0x14	partitions fire alarm	0x14 + 4 bytes
0x15	partitions alarm memory	0x15 + 4 bytes
0x16	partitions fire alarm memory	0x16 + 4 bytes
0x17	outputs state	0x17 + 16/32 bytes (*)
0x18	doors opened	0x18 + 8 bytes
0x19	doors opened long	0x19 + 8 bytes
0x1A	RTC and basic status bits	0x1A + 9 bytes (see description below)
0x1B	troubles part 1	0x1B + 47 bytes (see description below)
0x1C	troubles part 2	0x1C + 26 bytes (see description below)
0x1D	troubles part 3	0x1D + 60 bytes (see description below)
0x1E	troubles part 4	0x1E + 30 bytes (see description below)
0x1F	troubles part 5	0x1F + 31 bytes (see description below)
0x20	troubles memory part 1	0x20 + 47 bytes (see description below)
0x21	troubles memory part 2	0x21 + 39 bytes (see description below)
0x22	troubles memory part 3	0x22 + 60 bytes (see description below)
0x23	troubles memory part 4	0x23 + 30 bytes (see description below)
0x24	troubles memory part 5	0x24 + 48 bytes (see description below)
0x25	partitions with violated zones	0x25 + 4 bytes
0x26	zones isolate	0x26 + 16/32 bytes (*)
0x27	partitions with verified alarms	0x27 + 4 bytes
0x28	zones masked	0x28 + 16/32 bytes (*) (**)
0x29	zones masked memory	0x29 + 16/32 bytes (*) (**)
0x2A	partitions armed in mode 1	0x2A + 4 bytes (**)
0x2B	partitions with warning alarms	0x2B + 4 bytes (**)
0x2C	troubles part 6	0x2C + 45 bytes (see description below) (***)
0x2D	troubles part 7	0x2D + 47 bytes (see description below) (***)
0x2E	troubles memory part 6	0x2E + 45 bytes (see description below) (***)
0x2F	troubles memory part 7	0x2F + 48 bytes (see description below) (***)
0x30	troubles part 8	0x30 + 64 bytes (see description below) (****)
0x31	troubles memory part 8	0x31 + 64 bytes (see description below) (****)

Note: for INTEGRA v1.12 and newer, both 0x09 and 0x0A commands indicate really armed partitions, regardless of suppression arm status time.

cmd	meaning	answer
0x7B	+1 byte - read output power	0x7B + 3 bytes (*****): 1 byte - output number 1..256 (send 0 instead of 256) 2 bytes - power (high,low) x 100mW: 0x0000 = 0 W 0x0001 = 0.1 W 0x0002 = 0.2 W ... 0x0064 = 10.0 W ... 0xFFFF = undetermined
0x7C	INT-RS/ETHM-1 module version	0x7C + 12 bytes, e.g. for version 1.23 2012-05-27 (******): 11 bytes - '12320120527' 1 byte - .0 - 1 = module can serve 32 data bytes for zones/outputs .1 - 1 = module serves trouble (memory) part 8 <= Bit1 .2 - 1 = module serves arming with no bypass <= Bit2 .3 - 0 .4 - 0 .5 - 0 .6 - 0 .7 - 0
0x7D	+1 byte - read zone temperature	0x7D + 3 bytes (answer can be delayed up to 5s): 1 byte - zone number 1..256 (send 0 instead of 256) 2 bytes - temperature (high,low): 0x0000 = -55.0 °C 0x0001 = -54.5 °C 0x006E = 00.0 °C ... 0xFFFF = undetermined If requested zone is not temperature zone, answer will not be returned.
0x7E	INTEGRA version	0x7E + 14 bytes, e.g. for version 1.23 2012-05-27: 1 byte - INTEGRA type: 0, 1, 2, 3 = INTEGRA 24, 32, 64, 128 4 = INTEGRA 128-WRL SIM300 132 = INTEGRA 128-WRL LEON 66, 67, 72 = INTEGRA 64 Plus / 128 Plus / 256 Plus 11 bytes - '12320120527' 1 byte - language version (see Appendix 5) 1 byte - 255 = settings stored in FLASH, otherwise not stored

Note: in INT-RS Plus v2.xx all commands 0x00..0x2F can be sent as 2-bytes (i.e. command byte + 1 additional byte), but those of them that are not marked with (*) in above list will answer the same way as were sent as 1-byte command.

Note: if any command returns data that contains more zones/outputs etc. than INTEGRA connected to INT-RS, the redundancy data returned will be cleared. E.g. if INT-RS is connected to INTEGRA 24, the command 0x00 will return 16 data bytes in which only the first 3 bytes could be non-zero (i.e. zones 1..24) and the remaining 13 bytes should be zeros. Using 0x00 + 1 byte command (e.g. 0x00, 0x00 - in INT-RS Plus v2.xx only) will return 32 bytes in which 29 last bytes should be zeros.

* In INT-RS v1.xx this command is only 1-byte long and it returns 16 bytes of data.
In INT-RS Plus v2.xx this command can be used as 1-byte long (as in v1.xx) or as 2-bytes long - send it with 1 additional byte (no matter of its value) and this command will return 32 bytes of data (i.e. list of 1..256 zones/outputs).
2-bytes version of this command is especially useful in conjunction with INTEGRA 256 Plus.

** In INT-RS v1.xx answer can be delayed up to 5s.
In INT-RS Plus v2.xx answer is returned immediately.

*** Available in INT-RS Plus v2.xx only.

**** Modules with Bit1=0 (see 0x7C) do not know this command, so they will not reply.

***** INT-RS v1.xx modules do not know this command. INT-RS Plus v2.xx modules earlier than 2022-01-20 do not know this command. They will not reply. INTEGRA v1.20 2022-01-19 or newer is required.

****** Modules earlier than 2013-11-08 do not know this command, so they will not reply.

cmd	meaning	answer
0x7F	+0 bytes - list of new data in above cmds	0x7F + 5 bytes (each bit is set when new data is collected in corresponding command, each bit is cleared after reading the corresponding command):

1 byte -
- .0 - 1 = new data in 0x00 command
- .1 - 1 = new data in 0x01 command
- .2 - 1 = new data in 0x02 command
- .3 - 1 = new data in 0x03 command
- .4 - 1 = new data in 0x04 command
- .5 - 1 = new data in 0x05 command
- .6 - 1 = new data in 0x06 command
- .7 - 1 = new data in 0x07 command

1 byte -
- .0 - 1 = new data in 0x08 command
- .1 - 1 = new data in 0x09 command
- .2 - 1 = new data in 0x0A command
- .3 - 1 = new data in 0x0B command
- .4 - 1 = new data in 0x0C command
- .5 - 1 = new data in 0x0D command
- .6 - 1 = new data in 0x0E command
- .7 - 1 = new data in 0x0F command

1 byte -
- .0 - 1 = new data in 0x10 command
- .1 - 1 = new data in 0x11 command
- .2 - 1 = new data in 0x12 command
- .3 - 1 = new data in 0x13 command
- .4 - 1 = new data in 0x14 command
- .5 - 1 = new data in 0x15 command
- .6 - 1 = new data in 0x16 command
- .7 - 1 = new data in 0x17 command

1 byte -
- .0 - 1 = new data in 0x18 command
- .1 - 1 = new data in 0x19 command
- .2 - 1 = new data in 0x1A command
- .3 - 1 = new data in 0x1B command
- .4 - 1 = new data in 0x1C command
- .5 - 1 = new data in 0x1D command
- .6 - 1 = new data in 0x1E command
- .7 - 1 = new data in 0x1F command

1 byte -
- .0 - 1 = new data in 0x20 command
- .1 - 1 = new data in 0x21 command
- .2 - 1 = new data in 0x22 command
- .3 - 1 = new data in 0x23 command
- .4 - 1 = new data in 0x24 command
- .5 - 1 = new data in 0x25 command
- .6 - 1 = new data in 0x26 command
- .7 - 1 = new data in 0x27 command

In INT-RS Plus v2.xx (see below):

1 byte -
- .0 - 1 = new data in 0x28 command
- .1 - 1 = new data in 0x29 command
- .2 - 1 = new data in 0x2A command
- .3 - 1 = new data in 0x2B command
- .4 - 1 = new data in 0x2C command
- .5 - 1 = new data in 0x2D command
- .6 - 1 = new data in 0x2E command
- .7 - 1 = new data in 0x2F command

In INT-RS with Bit1=1 (see 0x7C) (see below):

1 byte -
- .0 - 1 = new data in 0x30 command
- .1 - 1 = new data in 0x31 command
- .2 - 0
- .3 - 0
- .4 - 0
- .5 - 0
- .6 - 0
- .7 - 0

See notes on the next page.

Note: INT-RS v1.xx - 0x7F command returns 0x7F + 5 bytes,
INT-RS Plus v2.xx - 0x7F command returns 0x7F + 5 bytes, but 0x7F command send with 1 additional byte (no matter of its value) returns 0x7F + 6 bytes (see the list above).
INT-RS with Bit1=1 (see 0x7C) - 0x7F command returns 0x7F + 5 bytes, but 0x7F command send with 1 additional byte (no matter of its value) returns 0x7F + 6 bytes, and send with 2 additional bytes (no matter of its value) returns 0x7F + 7 bytes (see the list above).

0x7F +12 bytes (this command version is available only in INT-RS Plus v2.xx module):
6 bytes - list of 0x00..0x2F commands to be sent automatically on changed data received from INTEGRA
6 bytes - list of 0x00..0x2F commands to be sent automatically on each data received from INTEGRA
If automatic mode should be stopped just send this command with 12 zeroes of data.
INT-RS with Bit1=1 (see 0x7C) can also serve this command in the following format:
+14 bytes:
7 bytes - list of 0x00..0x31 commands to be sent automatically on changed data received from INTEGRA
7 bytes - list of 0x00..0x31 commands to be sent automatically on each data received from INTEGRA
If automatic mode should be stopped just send this command with 12 or 14 zeroes of data.
After receiving the above command initially all commands specified in its first 6 (or 7) data bytes will be sent.
The data specified in this command is not shown as changes in response to 0x7F+0/1/2 command, since it will be automatically sent.

Answers description:

RTC and basic status bits - 7 bytes - time: YYYY-MM-DD hh:mm:ss - 0xYY, 0xYY, 0xMM, 0xDD, 0xhh, 0xmm, 0xss
1 byte - .210 - day of the week (0 = Monday, 1 = Tuesday, ..., 6 = Sunday)
.7 - 1 = service mode
.6 - 1 = troubles in the system (= flashing TROUBLE LED in keypad)
1 byte - .7 - 1 = ACU-100 are present in the system
.6 - 1 = INT-RX are present in the system
.5 - 1 = troubles memory is set in INTEGRA panel
.4 - 1 = Grade2/Grade3 option is set in INTEGRA panel
.3210 - INTEGRA type:
0 = INTEGRA 24
1 = INTEGRA 32
2 = INTEGRA 64 / INTEGRA 64 Plus
3 = INTEGRA 128 / INTEGRA 128 Plus
4 = INTEGRA 128-WRL
8 = INTEGRA 256 Plus
(to read detailed type use 0x7E command)

troubles part 1 - 16 bytes - troubles - technical zones
8 bytes - expanders AC trouble
8 bytes - exp. type 10 - output overload
- exp. type 11 - output overload
- exp. others - BATT trouble
8 bytes - expanders NO BATT trouble
3 bytes - system troubles (see description below)
1 byte - ETHM-1 - ping trouble
- otherwise - CA-64 PTSA modules AC trouble
1 byte - ETHM-1 - MAC/ID error for SATEL server
- INT-GSM - IMEI/ID error for SATEL server
- INT-KWRL - BAT1 trouble
- otherwise - CA-64 PTSA modules BATT trouble
1 byte - ETHM-1 / INT-GSM - no connection to SATEL server
- INT-KWRL - BAT2 trouble
- otherwise - CA-64 PTSA modules NO BATT trouble
1 byte - .0 - no ETHM connection to monitoring station 1
- .1 - no ETHM connection to monitoring station 2
- .2 - no GPRS connection to monitoring station 1
- .3 - no GPRS connection to monitoring station 2
- .4 - time server trouble
- .5 - GSM init error
- .6 - monitoring to IP station 1 trouble
- .7 - monitoring to IP station 2 trouble

troubles part 2 - 8 bytes - exp. type 11 - card readers head A trouble
- exp. type 12 - ACU synchro trouble
- exp. type 22 - busy INT-TXM
- exp. type 24 - no KNX connection
- exp. others - high BATT resistance
8 bytes - exp. type 11 - card readers head B trouble
- exp. others - BATT charging trouble
8 bytes - expanders supply output overload
2 bytes - exp. type 12 - ACU jammed
- exp. others - addressable zone expanders short circuit

troubles part 3 - 15 bytes - ACU-100 modules jam level
15 bytes - radio devices with low battery
15 bytes - radio devices with no communication
15 bytes - radio outputs with no communication

troubles part 4	-	8 bytes	- expanders with no communication
		8 bytes	- substituted expanders
		1 byte	- LCD keypads with no communication
		1 byte	- substituted LCD keypads
		1 byte	- ETHM-1 modules with no LAN cable / INT-RS modules with no DSR signal
		8 bytes	- expanders tamper
		1 byte	- LCD keypads tamper
		1 byte	- LCD keypad initiation errors
		1 byte	- auxiliary STM troubles (in INTEGRA Plus, in others value of this field is 0)
troubles part 5	-	1 byte	- low battery in masters key fobs
		30 bytes	- low battery in users key fobs
troubles part 6	-	15 bytes	- radio devices with low battery (last 120 ACU-100 devices in INTEGRA 256 Plus)
		15 bytes	- radio devices with no communication (last 120 ACU-100 devices in INTEGRA 256 Plus)
		15 bytes	- radio outputs with no communication (last 120 ACU-100 devices in INTEGRA 256 Plus)
troubles part 7	-	16 bytes	- troubles - technical zones 129..256 in INTEGRA 256 Plus
		16 bytes	- memory of troubles - technical zones 129..256 in INTEGRA 256 Plus
		15 bytes	- ACU-100 modules jam level (last 15 ACU-100 modules in INTEGRA 256 Plus)

troubles part 8 - 8 bytes - INT-GSM module installed on address 0x00 troubles:
- 1 byte - .0 - no ETHM connection to monitoring station 1
- .1 - no ETHM connection to monitoring station 2
- .2 - no GPRS SIM1 connection to monitoring station 1
- .3 - no GPRS SIM1 connection to monitoring station 2
- .4 - no GPRS SIM2 connection to monitoring station 1
- .5 - no GPRS SIM2 connection to monitoring station 2
- .6 - no SMS SIM1 connection to monitoring station 1
- .7 - no SMS SIM1 connection to monitoring station 2
- 1 byte - .0 - no SMS SIM2 connection to monitoring station 1
- .1 - no SMS SIM2 connection to monitoring station 2
- .2 - wrong SIM1 PIN code
- .3 - wrong SIM2 PIN code
- .4 - SIM1 logging to network error
- .5 - SIM2 logging to network error
- .6 - SIM1 account credit low
- .7 - SIM2 account credit low
- 1 byte - .0 - SIM1 SMS sending error
- .1 - SIM2 SMS sending error
- .2 - GSM jamming
- .3 - settings CRC error
- .4 - missing INT-GSM module
- .5 - changed INT-GSM module
- .6 - connection to SATEL server via GSM
- .7 - connection to MAIL server via GSM
- 1 byte - .0 - connection to NTP server via GSM
- .1 - 0
- .2 - 0
- .3 - 0
- .4 - 0
- .5 - 0
- .6 - 0
- .7 - 0
- 2 bytes - SIM1 CME error (high,low) in BCD format, 0x0000 = no error
- 2 bytes - SIM2 CME error (high,low) in BCD format, 0x0000 = no error

8 bytes - INT-GSM module installed on address 0x01 troubles
...
8 bytes - INT-GSM module installed on address 0x07 troubles

troubles memory part 1 - 47 bytes - memory of troubles part 1

troubles memory part 2 - 26 bytes - memory of troubles part 2
- 1 byte - memory of LCD keypads restart
- 8 bytes - memory of expanders restart
- 2 bytes - SIM CME error (high,low) - INTEGRA 128-WRL, 0 in other models
- 2 bytes - SIM CME error memory (high,low) - INTEGRA 128-WRL, 0 in other models

troubles memory part 3 - 15 bytes - zeros, but INTEGRA 256 Plus sends here:
- 2 bytes - addressable zone expanders short circuit or jammed ACU-100 modules (last 14 modules)
- 2 bytes - memory of above
- 11 bytes - zeros
- 15 bytes - memory of radio devices with low battery
- 15 bytes - memory of radio devices with no communication
- 15 bytes - memory of radio outputs with no communication

troubles memory part 4 - 30 bytes - memory of troubles part 4

troubles memory part 5 - 16 bytes - memory of long zones violation
- 16 bytes - memory of no zones violation
- 16 bytes - memory of zones tamper

troubles memory part 6 - 45 bytes - memory of troubles part 6

troubles memory part 7 - 16 bytes - memory of long zones 129..256 violation in INTEGRA 256 Plus
16 bytes - memory of no zones 129..256 violation in INTEGRA 256 Plus
16 bytes - memory of zones 129..256 tamper in INTEGRA 256 Plus

troubles memory part 8 - 64 bytes - memory of troubles part 8

System troubles:

1*st* byte -
.0 - OUT1 trouble
.1 - OUT2 trouble
.2 - OUT3 trouble
.3 - OUT4 trouble
.4 - +KPD trouble
.5 - +EX1 or +EX2 trouble
.6 - BATT trouble
.7 - AC trouble

2*nd* byte -
.0 - DT1 trouble
.1 - DT2 trouble
.2 - DTM trouble
.3 - RTC trouble
.4 - no DTR signal
.5 - no BATT present
.6 - external modem initialization trouble
.7 - external model command (ATE0V1Q0H0S0=0) trouble

3*rd* byte -
.0 - no voltage on telephone line (INTEGRA 24, 32, 64 and 128)
.0 - auxiliary ST processor trouble (INTEGRA 128-WRL)
.1 - bad signal on telephone line
.2 - no signal on telephone line
.3 - monitoring to station 1 trouble
.4 - monitoring to station 2 trouble
.5 - EEPROM or access to RTC trouble
.6 - RAM memory trouble
.7 - INTEGRA main panel restart memory

Part 2 - INTEGRA control:

0x80 arm in mode 0:
+ 8 bytes - user code (with prefix, if required by INTEGRA), *e.g.:*
if code is '1234', no prefixes: 0x12, 0x34, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF
if code is '1234', prefix is '97': 0x97, 0x12, 0x34, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF
+ 4 bytes - partition list, *e.g.:*
if partition 1, 2, and 29 have to be armed: 0x03, 0x00, 0x00, 0x10
Function should return the following codes (see the 0xEF command for details):
0x00 - OK
0x01 - requesting user code not found
0x11 - can not arm, but can use force arm
0x12 - can not arm

0x81 arm in mode 1 *data structure and answer as above*

0x82 arm in mode 2 *data structure and answer as above*

0x83 arm in mode 3 *data structure and answer as above*

0x84 disarm *data structure as above*
If function is accepted, function result can be checked by observe the system state

0x85 clear alarm *data structure as above*
If function is accepted, function result can be checked by observe the system state

0xA0 force arm in mode 0 *data structure as above*
Function should return the following codes (see the 0xEF command for details):
0x00 - OK
0x01 - requesting user code not found
0x12 - can not arm

0xA1 force arm in mode 1 *data structure and answer as above*

0xA2 force arm in mode 2 *data structure and answer as above*

0xA3 force arm in mode 3 *data structure and answer as above*

Starting from INT-RS Plus v2.19 2020-11-03 an extra byte can be added in commands 0x80, 0x81, 0x82, 0x83, 0xA0, 0xA1, 0xA2, 0xA3 (after 4 bytes of partition list). The meaning of this extra byte is as follows:
0x00 - arming as without this byte
0x80 - arming without zone bypasses and without exit delay (if this value is used in 0x81 or 0xA1 command - only without exit delay, bypasses will be present)
Modules with Bit2=0 (see 0x7C) do not know this command version, so they will not accept and not reply such command.

0x86 zones bypass
+ 8 bytes - user code - *see example for 0x80*
+ 16/32 bytes (*) - zone list, *e.g.: if zone 1, 3, 62 and 120 have to be bypassed:*
0x05, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x20, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x80, 0x00
If function is accepted, function result can be checked by observe the system state

0x87 zones unbypass *data structure as above*
If function is accepted, function result can be checked by observe the system state

0x88 outputs on
+ 8 bytes - user code - *see example for 0x80*
+ 16/32 bytes (*) - output list - *see example for 0x86*
If function is accepted, function result can be checked by observe the system state

0x89 outputs off *data structure as above*
If function is accepted, function result can be checked by observe the system state

0x8A open door
+ 8 bytes - user code - *see example for 0x80*
+ 16/32 bytes (*) - output list - *see example for 0x86* - outputs of a 101 type can be 'opened'
+ 8 bytes - expander list, *e.g.: if expander address 4 and 63 doors have to be opened:*
0x10, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x80
If function is accepted, function result can be checked by observe the system state

0x8B clear trouble mem. + 8 bytes - user code - *see example for 0x80*
If function is accepted, function result can be checked by observe the system state

0x8C read event + 3 bytes - last event index. Start reading events with these 3 bytes equal:
0xFF, 0xFF, 0xFF - the last event from standard events log will be returned. Test if bit Z is 0 to check if it is 'end of events' record (see table below)
0x00, 0xFF, 0xFF - the last event from Grade2/3 events log will be returned. Test if 1st byte is 0 to check if it is 'end of events' record (see table below)
To read previous event (if this one is not 'end of events' record), call this function with event index returned by this function. Check if returned record is 'end of events' testing Z or 1st byte, depending on how events reading was started (0xFF, 0xFF, 0xFF = standard log, 0x00, 0xFF, 0xFF = Grade2/3 log).
Function result - 15 bytes: 1 byte - 0x8C
8 bytes - event record - see the table below
3 bytes - event index
3 bytes - event index used to call the function

Bit:	.7	.6	.5	.4	.3	.2	.1	.0
1st byte	Y	Y	Z	E	S2	S2	S1	S1
2nd byte	K	K	K	D	D	D	D	D
3rd byte	M	M	M	M	T	T	T	T
4th byte	t	t	t	t	t	t	t	t
5th byte	P	P	P	P	P	R	C	C
6th byte	c	c	c	c	c	c	c	c
7th byte	n	n	n	n	n	n	n	n
8th byte	S	S	S	u	u	u	u	u

YY - year marker (i.e. YEAR mod 4, e.g. 2013 mod 4 = 1, 2014 mod 4 = 2)
Z - 1 = record not empty
E - 1 = event present (normally ZE should be both 00 or 11)
S1, S2 - status of monitoring to station 1 and 2, respectively:
00 - new event, not processed by monitoring service
01 - event sent
10 - event not sent
11 - event not monitored
KKK - event class: 000 - zone and tamper alarms
001 - partition and expander alarms
010 - arming, disarming, alarm clearing
011 - zone bypasses and unbypasses
100 - access control
101 - troubles
110 - user functions
111 - system events
DDDDD - day of the month (1..31)
MMMM - month (1..12)
TTTTttttttt - time in minutes (e.g. 17:53 = 17*60+53 = 1073)
PPPPP - partition number
R - 1 = restore
CCccccccc - event code - use command 0x8F to convert to text (or see Appendix 1 for event list)
nnnnnnnn - source number (e.g. zone number, user number) (see Appendix 1)
SSS - object number (0..7)
uuuuu - user control number - this number is increased every time the user is created (i.e. it will be changed after erase and create the user). This number is important only in those events which have the user in its description (e.g. arming by user; but e.g. zone alarm - not)

0x8D enter 1*st* code + 8 bytes - user code - *see example for 0x80*
+ 4 bytes - partition list - *see example for 0x80*
+ 2 bytes - 1*st* code validity period (low,high) in seconds
+ 1 byte - action: 0 - enter 1*st* code for arm
1 - enter 1*st* code for disarm
2 - cancel 1*st* code (validity period inessential)
If function is accepted, function result can be checked by observe the system state

0x8E set RTC clock + 8 bytes - user code - *see example for 0x80*
+ 14 bytes - time and date to set (14 ASCII chars: yyyymmddhhmmss)

0x8F	get event text	+ 2 bytes (high,low) - decode event code to text description: .15 - 0 = short, 1 = long text description 11 lsb - event code (i.e. RCCccccccc bits as in 0x8C command) Function result - 22 or 52 bytes (depends on selection of short/long format) as follows: 1 byte - 0x8F 2 bytes - two bytes used to call this function 1 byte - kind of long description (see Appendix 2) 2 bytes - kind of short description (see Appendix 3) 16 or 46 bytes - event text
0x90	zones isolate	*data structure as in 0x86* If function is accepted, function result can be checked by observe the system state
0x91	outputs switch	*data structure as in 0x88* If function is accepted, function result can be checked by observe the system state

* In INT-RS v1.xx this command can have 16 data bytes.
In INT-RS Plus v2.xx this command can have 16 or 32 data bytes, but 32 data bytes can be used only with INTEGRA 256 Plus.
If this command with 32 data bytes is used with other INTEGRA type, INT-RS will shrink these 32 data bytes to 16 data bytes.

Part 3 - users management:

General users numbering scheme in INTEGRA is as follow:
- 1..240 - user (max. value depends on INTEGRA type)
- 241..248 - master (max. value depends on INTEGRA type)
- 255 - service

0xE0 read self-info

+ 4/8 bytes - if 4 bytes - user code only, e.g.:
if code '1234': `0x12, 0x34, 0xFF, 0xFF`
if 8 bytes - recommended usage - prefix + user code, e.g.:
if prefix '987', code '1234': `0x98, 0x71, 0x23, 0x4F, 0xFF, 0xFF, 0xFF, 0xFF`
if no prefix, code '1234': `0x12, 0x34, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF`

Function result - 30 bytes:
1 byte - 0xE0
1 byte - user number - see above numbering scheme
2 bytes - if user - user telephone code
if master - 0x00, 0x00
if service - 1*st* byte - existing masters, 2*nd* byte - 0x00
4 bytes - user partitions
1 byte - XYIpTTTT:
X - 1 = user did not changed his code yet
Y - 1 = user code is recognized by other user
I - user right - zones isolating
p - 1 = user has changed his telephone code
TTTT - user type:
0 - normal
1 - single
2 - time renewable
3 - time not renewable
4 - duress
5 - mono outputs
6 - bi outputs
7 - partitions temporary blocking
8 - access to cash machine
9 - guard
10 - schedule
1 byte - user time
3 bytes - user rights:
1*st* byte - .0 - arming
.1 - disarming
.2 - alarm clearing in own partitions
.3 - alarm clearing in own object
.4 - alarm clearing in whole system
.5 - arm deferring
.6 - code changing
.7 - users editing
2*nd* byte - .0 - zones bypassing
.1 - clock setting
.2 - troubles viewing
.3 - events viewing
.4 - zones resetting
.5 - options changing
.6 - tests
.7 - downloading
3*rd* byte - .0 - can always disarm (i.e. even if armed by other user)
.1 - voice messaging clearing
.2 - GUARDX using
.3 - access to temporary blocked partitions
.4 - entering 1*st* code
.5 - entering 2*nd* code
.6 - outputs control
.7 - clearing latched outputs
16 bytes - user name
1 byte - .7 - user right - Simple user
.6 - user right - master
.5 - 1 = need to change prefix (can be only for master or user with master right)
.4 - 1 = need to change telephone code (can be only for users)
.3 - 1 = need to change code (can be only for time renewable users)
if user/master - .210 = object number (0..7)
if service - .210 = 0

The user must have the 'GUARDX using' right set active, otherwise the error 'requesting user code not found' will be returned.

0xE1 read user

+ 4/8 bytes - user code (see example for 0xE0)
+ 1 byte - user number to read (1..240 - user, 241..248 - master)
Function result - 29 bytes:
1 byte - 0xE1
1 byte - user number:
1..240 - user
241..248 - master
255 - service
4 bytes - user partitions
1 byte - XYIpTTTT - *see description for 0xE0*
1 byte - user time
1 byte - user time - temporary value - valid only for schedule user
3 bytes - user rights - *see description for 0xE0*
16 bytes - user name
1 byte - .7 - user right - Simple user
.6 - user right - master
.210 - if user/master = object number (0..7)
- if service = 0

0xE2 read users list

+ 4/8 bytes - user code (see example for 0xE0)
+ 1 byte - user number (1..248) which users list is to be read
Function result - 62 bytes:
1 byte - 0xE2
1 byte - user number
30 bytes - list of all existing users
30 bytes - list of users that can be edited by this user

0xE3 read user locks

+ 4/8 bytes - user code (see example for 0xE0)
+ 1 byte - user number (1..248) which locks are to be read
Function result - 10 bytes:
1 byte - 0xE3
1 byte - user number
8 bytes - list of user locks

0xE4 write user locks

+ 4/8 bytes - user code (see example for 0xE0)
+ 1 byte - user number (1..248) which locks are to be written
+ 8 bytes - list of user locks

0xE5 remove user

+ 4/8 bytes - user code (see example for 0xE0)
+ 1 byte - user number (1..248) to remove

0xE6 create user

+ 4/8 bytes - user code (see example for 0xE0)
+ 1 byte - user number (1..248) to create, 255 - auto
+ 4 bytes - user-to-create code
+ 2 bytes - user-to-create telephone code - *4 x BCD or 0xFFFF*
+ 4 bytes - user-to-create partitions
+ 1 byte - .7 - user right - Simple user
.6 - user right - master
.5 - user right - zones isolating
.3210 - user-to-create type
+ 1 byte - user-to-create time
+ 1 byte - user-to-create temporary time - *valid only for schedule user*
+ 1 byte - user-to-create 1*st* byte of rights
+ 1 byte - user-to-create 2*nd* byte of rights
+ 1 byte - user-to-create 3*rd* byte of rights
+ 16 byte - user-to-create name
+1 byte - user-to-create object - valid only if service is the creator

0xE7 change user

+ 4/8 bytes - user code (see example for 0xE0)
+ 1 byte - user number (1..248) to change
+ 4 bytes - user-to-change code - *will not be changed if equal 0xFFFFFFFF*
+ 2 bytes - user-to-change telephone code - *will not be changed if equal 0xFFFF*
+ 4 bytes - user-to-change partitions
+ 1 byte - .7 - user right - Simple user
.6 - user right - master
.5 - user right - zones isolating
.3210 - user-to-change type
+ 1 byte - user-to-change time
+ 1 byte - user-to-change temporary time - *valid only for schedule user*
+ 1 byte - user-to-change 1*st* byte of rights
+ 1 byte - user-to-change 2*nd* byte of rights
+ 1 byte - user-to-change 3*rd* byte of rights
+ 16 byte - user-to-change name

In above commands you can set user type as follows:

0. Normal
1. Single
2. Time renewable
3. Time not renewable
4. Duress
5. Mono outputs
6. Bi outputs
7. Partition temporary blocking
8. Access to cash machine
9. Guard
10. Schedule

For users of the 2 and 3 types in the field '+ 1 byte - user-to-create/change time' you should give how many days the user should exist.
For users of the 10 type in the field '+ 1 byte - user-to-create/change time' you should give user schedule number (1..8),
and in the field '+ 1 byte - user-to-create/change temporary time' you give how many days the user should exist (0..254 - 0..254 days, 255 - infinite).
For users of the 7 type the field '+ 1 byte - user-to-create/change time' stands for the blocking time (1..109 minutes).
For other user types these two fields are not important (give 0 as filling).

0xE8 user DALLAS/proximity card/key fob managing:

Read card/DALLAS list:
+ 4/8 bytes - user code (see example for 0xE0)
+ 1 byte - '0' (ASCII 48 char)
Function result - 64 bytes:
1 byte - 0xE8
1 byte - '0'
31 bytes - proximity card list
31 bytes - DALLAS list

Read user proximity card:
+ 4/8 bytes - user code (see example for 0xE0)
+ 1 byte - '1' (ASCII 49 char)
+ 1 byte - user number (1..248) which proximity card to read
Function result - 8 bytes:
1 byte - 0xE8
1 byte - '1'
1 byte - user number
5 bytes - proximity card number

Write user proximity card:
+ 4/8 bytes - user code (see example for 0xE0)
+ 1 byte - '2' (ASCII 50 char)
+ 1 byte - user number (1..248) which proximity card to write
+ 5 bytes - proximity card number

Read user DALLAS:
+ 4/8 bytes - user code (see example for 0xE0)
+ 1 byte - '3' (ASCII 51 char)
+ 1 byte - user number (1..248) which DALLAS to read
Function result - 9 bytes:
1 byte - 0xE8
1 byte - '3'
1 byte - user number
6 bytes - DALLAS number

Write user DALLAS:
+ 4/8 bytes - user code (see example for 0xE0)
+ 1 byte - '4' (ASCII 52 char)
+ 1 byte - user number (1..248) which DALLAS to write
+ 6 bytes - DALLAS number

Read user INT-RX key fob:
+ 4/8 bytes - user code (see example for 0xE0)
+ 1 byte - '7' (ASCII 55 char)
+ 1 byte - user number (1..248) which INT-RX key fob to read
Function result - 14 bytes:
1 byte - 0xE8
1 byte - '7'
1 byte - user number
4 bytes - INT-RX key fob 28-bit serial number (high..low)
6 bytes - settings of key presses (zones number to violate in INTEGRA panel)
1 byte - bit list of keys that generate no events

Write user INT-RX key fob:
+ 4/8 bytes - user code (see example for 0xE0)
+ 1 byte - '8' (ASCII 56 char)
+ 1 byte - user number (1..248) which INT-RX key fob to write
+ 4 bytes - INT-RX key fob 28-bit serial number (high..low)
+ 6 bytes - settings of key presses (zones number to violate in INTEGRA panel)
+ 1 byte - bit list of keys that generate no events

Read user ABAX key fob:
+ 4/8 bytes - user code (see example for 0xE0)
+ 1 byte - '9' (ASCII 57 char)
+ 1 byte - user number (1..248) which ABAX key fob to read
Function result - 14 bytes:
1 byte - 0xE8
1 byte - '9'
1 byte - user number
3 bytes - ABAX key fob 20-bit serial number (high..low)
6 bytes - settings of key presses (zones number to violate in INTEGRA panel)
1 byte - bit list of keys that generate no events
1 byte - bit list (max. three '1's) of INTEGRA output status used as acknowledge

Write user ABAX key fob:
+ 4/8 bytes - user code (see example for 0xE0)
+ 1 byte - 'A' (ASCII 41 char)
+ 1 byte - user number (1..248) which ABAX key fob to write
+ 3 bytes - ABAX key fob 20-bit serial number (high..low)
+ 6 bytes - settings of key presses (zones number to violate in INTEGRA panel)
+ 1 byte - bit list of keys that generate no events
+ 1 byte - bit list (max. three '1's) of INTEGRA output status used as acknowledge

Function can give result as below in a case of command that does not return result or in a case of an error:

1 byte - 0xE8
1 byte - '?'
1 byte - repeated command (i.e. '0', '1', '2', '3', '4', '7', '8', '9' or 'A')
1 byte - user number (can be inessential in some cases, e.g. in a case of wrong command)
1 byte - confirmation or error:
0x00 - OK
0x01 - unknown user code
0x02 - no rights to perform action (on selected user)
0x08 - unknown command
0x8? - other errors

0xE9 change user code
+ 4/8 bytes - user code (see example for 0xE0)
+ 4 bytes - new user code, *e.g. for code '12347': 0x12, 0x34, 0x7F, 0xFF*
The length of new user code should be at least as defined in INTEGRA (and max. 8 digits).

0xEA change user tel. code
+ 4/8 bytes - user code (see example for 0xE0)
+ 2 bytes - new user tel. code, *e.g. for code '1234': 0x12, 0x34*
New user tel. code should be four digits (0..9) long.
If user does not have tel. code, the new tel. code will not be created.

0xEE read device name

+ 1 byte - device type to read:
- 0 - partition (1..32)
- 1 - zone (1..128), in INTEGRA 256 Plus - up to 256
- 2 - user (1..255) (*)
- 3 - expander/LCD (129..192 - expander, 193..210 - LCD)
- 4 - output (1..128), in INTEGRA 256 Plus - up to 256
- 5 - zone (1..128) with partition assignment (*), in INTEGRA 256 Plus - up to 256
- 6 - timer (1..64)
- 7 - telephone (1..16)
- 15 - object (1..8)
- 16 - partition (1..32) with object assignment (*)
- 17 - output (1..128), in INTEGRA 256 Plus - up to 256, with duration time (**)
- 18 - partition (1..32) with object assignment and options (**)
- 19 - partition (1..32) with object assignment, options and dependent partitions (***)

+ 1 byte - device number to read (send 0 instead of 256 in INTEGRA 256 Plus)

Function result - 20 bytes (* 21 bytes) (** 22 bytes) (** 25 bytes) (*** 29 bytes):

1 byte - 0xEE

1 byte - device type - *see above*

1 byte - device number - *see above*

1 byte - device type/function:

if partition - partition type - *see e.g. DLOADX for partition types list*

if zone - zone reaction - *see e.g. DLOADX for zone reactions list*

if user - 0

if object - 0

if expander - expander type:
- 1 - CA-64 PP
- 2 - CA-64 E
- 3 - CA-64 O
- 4 - CA-64 EPS
- 5 - CA-64 OPS
- 6 - CA-64 ADR
- 7 - INT-ORS
- 8 - INT-S/SK
- 9 - INT-SZ/SZK
- 10 - CA-64 DR
- 11 - CA-64 SR
- 12 - ACU-100
- 13 - INT-IORS
- 14 - CA-64 Ei
- 15 - CA-64 SM
- 16 - INT-AV
- 17 - INT-IT
- 18 - CA-64 EPSi
- 19 - INT-SCR
- 20 - INT-ENT
- 21 - INT-RX
- 22 - INT-TXM
- 23 - INT-VG
- 24 - INT-KNX
- 25 - INT-PP
- 26 - INT-ORSPS
- 27 - INT-IORSPS
- 28 - INT-ADR

if LCD - 'LCD' type:
- 1 - INT-KLCD
- 2 - INT-KLCDR
- 3 - INT-PTSA
- 4 - INT-RS
- 5 - ETHM-1
- 6 - INT-KSG
- 8 - INT-TSI
- 10 - INT-TSG
- 12 - INT-TSH
- 14 - INT-KWRL
- 15 - INT-GSM
- 16 - ETHM-1 Plus + INT-GSM

if output - output function - *see e.g. DLOADX for output functions list*

16 bytes - device name
1 byte - partition number (1..32) the zone is assigned to. This 21*st* byte appears only if the device type to read is 5 (*)
1 byte - user serial number (0..31) + 128. This 21*st* byte appears only if the device type to read is 2 (*)
1 byte - object number (1..8) the partition is assigned to. This 21*st* byte appears only if the device type to read is 16 (*) or 18 (**) or 19 (***)
1 byte - partition options. This 22*nd* byte appears only if the device type to read is 18 (**) or 19 (***)
.0 - 1 = two codes to arm
.1 - 1 = two codes to disarm
.2 - 1 = timer priority
.3 - 1 = two codes on two devices
.4 - 1 = alarm verification
.5 - 1 = exit delay can be shorten
.6 - 1 = infinite exit delay
.7 - 1 = constant (undefinable) 1*st* code validity period
1 byte - partition options. This 23r*d* byte appears only if the device type to read is 18 (**) or 19 (***)
.0 - 1 = constant (uneditable) blocking time (if partition type is 1)
.1 - 1 = do not disarm in case of alarm (if partition type is 1)
.2 - 1 = 0
.3 - 1 = 0
.4 - 1 = 0
.5 - 1 = 0
.6 - 1 = 0
.7 - 1 = auto-arm can be deferred
2 bytes - output duration time (high,low) x 0.1s. These 21*st* and 22*nd* bytes appear only if the device type to read is 17 (**)
2 bytes - auto-arm defer timer. These 24*th* and 25*th* bytes appear only if the device type to read is 18 (**) or 19 (***):
2 msb - 00 = inactive
01 = defer time set (but time is not running)
10 = timer is running
14 lsb - defer time [s]
4 bytes - timers / dependent partitions. Present only if the device type to read is 19 (***)

/ This command is available in INT-RS v1.14 2020-01-23 or newer firmware version and in INT-RS Plus v2.18 2020-01-23 or newer firmware version along with INTEGRA v1.19 2020-01-23 or newer firmware version.

*** This command is available in INT-RS v1.19 2023-02-22 or newer firmware version and in INT-RS Plus v2.21 2023-02-22 or newer firmware version along with INTEGRA v1.21 2023-02-21 or newer firmware version.

INT-RS module answers on **every** command - function result or 0xEF result (described below), so after sending any command to the module please wait for answer before sending the next one (or give the module e.g. 3 seconds time-out).

0xEF result + 1 byte - result code:
0x00 - OK
0x01 - requesting user code not found
0x02 - no access
0x03 - selected user does not exist
0x04 - selected user already exists
0x05 - wrong code or code already exists
0x06 - telephone code already exists
0x07 - changed code is the same
0x08 - other error
0x11 - can not arm, but can use force arm
0x12 - can not arm
0x8? - other errors
0xFF - command accepted (i.e. data length and crc OK), will be processed

Appendix 1 - event list

Full event list that INTEGRA v1.21 2023-02-21 can generate (older INTEGRA can generate subset of these events) - 4 columns:
1. Event code (CCccccccc) / 2. New/restore (R) / 3. Kind of long description (see Appendix 2) / 4. Event text description

```
  1,0, 6,'Voice messaging aborted                      '
  2,0, 3,'Change of user access code                   '
  2,1, 3,'Change of user access code                   '
  3,0, 6,'Change of user access code                   '
  4,0, 6,'Zones bypasses                               '
  5,0, 6,'Zones reset                                  '
  6,0, 6,'Change of options                            '
  7,0, 6,'Permission for service access                '
  7,1, 6,'Permission for service access removed        '
  8,0, 6,'Addition of user                             '
  9,0, 6,'New user                                     '
 10,0, 6,'Edition of user                              '
 11,0, 6,'User changed                                 '
 12,0, 6,'Removal of user                              '
 13,0, 6,'User removed                                 '
 14,0, 6,'Breaking user code                           '
 15,0, 6,'User access code broken                      '
 16,0, 6,'Addition of master                           '
 17,0, 6,'Edition of master                            '
 18,0, 6,'Removal of master                            '
 19,0, 4,'RS-downloading started                       '
 19,1, 4,'RS-downloading finished                      '
 20,0, 6,'TEL-downloading started                      '
 21,0, 6,'Monitoring station 1A test                   '
 22,0, 6,'Monitoring station 1B test                   '
 23,0, 6,'Monitoring station 2A test                   '
 24,0, 6,'Monitoring station 2B test                   '
 26,0, 2,'Access to cash machine granted               '
 27,0, 3,'Breaking user code                           '
 27,1, 3,'Breaking user code                           '
 28,0, 3,'User access code broken                      '
 28,1, 3,'User access code broken                      '
 29,0, 7,'Automatically removed temporal user          '
 30,0, 0,'Service access automatically blocked         '
 31,0, 0,'Main panel firmware updated                  '
 32,0, 4,'System settings stored in FLASH memory       '
 33,0, 0,'STARTER started                              '
 34,0, 0,'STARTER started from RESET jumper            '
 36,0, 7,'Removal of single user                       '
 37,0, 2,'First access code entered                    '
 38,0, 3,'Voice messaging aborted                      '
 38,1, 3,'Voice messaging aborted                      '
 39,0, 1,'Vibration sensors test OK                    '
 40,0, 6,'Change of prefix                             '
 41,0, 0,'Change of winter time to summer time         '
 42,0, 0,'Change of summer time to winter time         '
 43,0, 6,'Guard round                                  '
 44,0, 5,'First access code expired                    '
 45,0, 2,'First access code canceled                   '
 46,0, 7,'Remote (telephone) control started           '
 46,1, 7,'Remote (telephone) control finished          '
 47,0,10,'Remote switch turned on                      '
 47,1,10,'Remote switch turned off                     '
 48,0,30,'TCP/IP connection started (Internet)         '
 48,1,30,'TCP/IP connection finished (Internet)        '
 49,0,30,'TCP/IP connection failed (Internet)          '
 50,0,31,'IP address                                   '
 51,0, 4,'Invalidation of system settings in FLASH     '
 52,0, 6,'Service note cleared                         '
 53,0, 1,'Vibration sensors test interrupted           '
 54,0,30,'TCP/IP connection started (DLOADX)           '
 54,1,30,'TCP/IP connection finished (DLOADX)          '
 55,0,30,'TCP/IP connection failed (DLOADX)            '
 56,0,30,'TCP/IP connection started (GUARDX)           '
 56,1,30,'TCP/IP connection finished (GUARDX)          '
 57,0,30,'TCP/IP connection failed (GUARDX)            '
 58,0,30,'TCP/IP connection started (GSM socket)       '
 58,1,30,'TCP/IP connection finished (GSM socket)      '
 59,0,30,'TCP/IP connection failed (GSM socket)        '
 60,0,30,'TCP/IP connection started (GSM http)         '
 60,1,30,'TCP/IP connection finished (GSM http)        '
 61,0,30,'TCP/IP connection failed (GSM http)          '
 62,0, 6,'User access                                  '
 63,0, 6,'User exit                                    '
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 64,0, 4,'Keypad temporary blocked                    '
 65,0, 4,'Reader temporary blocked                    '
 66,0, 1,'Arming in "Stay" mode                       '
 67,0, 1,'Arming in "Stay, delay=0" mode              '
 68,0, 0,'System real-time clock set                  '
 69,0, 6,'Troubles memory cleared                     '
 70,0, 6,'User logged in                              '
 71,0, 6,'User logged out                             '
 72,0, 6,'Door opened from LCD keypad                 '
 73,0,13,'Door opened                                 '
 74,0, 6,'System restored                             '
 75,0, 0,'ETHM/GPRS key changed                       '
 76,0, 6,'Messaging test started                      '
 77,0, 1,'Alarm monitoring delay                      '
 78,0, 4,'Network cable unplugged                     '
 78,1, 4,'Network cable OK                            '
 79,0, 9,'Messaging trouble                           '
 80,0, 9,'Messaging doubtful                          '
 81,0, 9,'Messaging OK                                '
 82,0, 9,'Messaging confirmed                         '
 83,0, 1,'3 wrong access codes                        '
 84,0, 1,'Alarm - proximity card reader tamper        '
 84,1, 1,'Proximity card reader restore               '
 85,0, 4,'Unauthorised door opening                   '
 86,0, 3,'User exit                                   '
 86,1, 3,'User exit                                   '
 87,0, 2,'Partition temporary blocked                 '
 88,0, 4,'Communication module error                  '
 88,1, 4,'Communication module OK                     '
 89,0, 4,'Long opened door                            '
 89,1, 4,'Long opened door closed                     '
 90,0, 0,'Downloading suspended                       '
 91,0, 0,'Downloading started                         '
 92,0, 1,'Alarm - module tamper (verification error)  '
 92,1, 1,'Module tamper restore (verification OK)     '
 93,0, 1,'Alarm - module tamper (lack of presence)    '
 93,1, 1,'Module tamper restore (presence OK)         '
 94,0, 1,'Alarm - module tamper (TMP input)           '
 94,1, 1,'Module tamper restore (TMP input)           '
 95,0,12,'Output overload                             '
 95,1,12,'Output overload restore                     '
 96,0,12,'No output load                              '
 96,1,12,'Output load present                         '
 97,0, 1,'Long zone violation                         '
 97,1, 1,'Long zone violation restore                 '
 98,0, 1,'No zone violation                           '
 98,1, 1,'No zone violation restore                   '
 99,0, 1,'Zone violation                              '
 99,1, 1,'Zone restore                                '
100,0, 1,'Medical request (button)                    '
100,1, 1,'Release of medical request button           '
101,0, 1,'Medical request (remote)                    '
101,1, 1,'Remote medical request restore              '
110,0, 1,'Fire alarm                                  '
110,1, 1,'Fire alarm zone restore                     '
111,0, 1,'Fire alarm (smoke detector)                 '
111,1, 1,'Smoke detector zone restore                 '
112,0, 1,'Fire alarm (combustion)                     '
112,1, 1,'Combustion zone restore                     '
113,0, 1,'Fire alarm (water flow)                     '
113,1, 1,'Water flow detection restore                '
114,0, 1,'Fire alarm (temperature sensor)             '
114,1, 1,'Temperature sensor zone restore             '
115,0, 1,'Fire alarm (button)                         '
115,1, 1,'Release of fire alarm button                '
116,0, 1,'Fire alarm (duct)                           '
116,1, 1,'Duct zone restore                           '
117,0, 1,'Fire alarm (flames detected)                '
117,1, 1,'Flames detection zone restore               '
120,0, 1,'PANIC alarm (keypad)                        '
121,0, 2,'DURESS alarm                                '
122,0, 1,'Silent PANIC alarm                          '
122,1, 1,'Silent panic alarm zone restore             '
123,0, 1,'Audible PANIC alarm                         '
123,1, 1,'Audible panic alarm zone restore            '
126,0, 5,'Alarm - no guard                            '
130,0, 1,'Burglary alarm                              '
130,1, 1,'Zone restore                                '
131,0, 1,'Alarm (perimeter zone)                      '
131,1, 1,'Perimeter zone restore                      '
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132,0, 1,'Alarm (interior zone)                          '
132,1, 1,'Interior zone restore                          '
133,0, 1,'Alarm (24h burglary zone)                      '
133,1, 1,'24h burglary zone restore                      '
134,0, 1,'Alarm (entry/exit zone)                        '
134,1, 1,'Entry/exit zone restore                        '
135,0, 1,'Alarm (day/night zone)                         '
135,1, 1,'Day/night zone restore                         '
136,0, 1,'Alarm (exterior zone)                          '
136,1, 1,'Exterior zone restore                          '
137,0, 1,'Alarm (tamper perimeter)                       '
137,1, 1,'Tamper perimeter zone restore                  '
139,0, 1,'Verified alarm                                 '
143,0,11,'Alarm - communication bus trouble              '
143,1,11,'Communication bus OK                           '
144,0, 1,'Alarm (zone tamper)                            '
144,1, 1,'Zone tamper restore                            '
145,0, 1,'Alarm (module tamper)                          '
145,1, 1,'Module tamper restore                          '
150,0, 1,'Alarm (24h no burglary zone)                   '
150,1, 1,'24h no burglary zone restore                   '
151,0, 1,'Alarm (gas detector)                           '
151,1, 1,'Gas detection zone restore                     '
152,0, 1,'Alarm (refrigeration)                          '
152,1, 1,'Refrigeration zone restore                     '
153,0, 1,'Alarm (heat loss)                              '
153,1, 1,'Heat loss zone restore                         '
154,0, 1,'Alarm (water leak)                             '
154,1, 1,'Water leak zone restore                        '
155,0, 1,'Alarm (protection loop break)                  '
155,1, 1,'Protection loop break zone restore             '
156,0, 1,'Alarm (day/night zone tamper)                  '
156,1, 1,'Day/night zone tamper restore                  '
157,0, 1,'Alarm (low gas level)                          '
157,1, 1,'Low gas level zone restore                     '
158,0, 1,'Alarm (high temperature)                       '
158,1, 1,'High temperature zone restore                  '
159,0, 1,'Alarm (low temperature)                        '
159,1, 1,'Low temperature zone restore                   '
200,0, 1,'Alarm (fire protection loop)                   '
200,1, 1,'Fire protection loop zone restore              '
201,0, 1,'Alarm (low water pressure)                     '
201,1, 1,'Low water pressure zone restore                '
202,0, 1,'Alarm (low CO2 pressure)                       '
202,1, 1,'Low CO2 pressure zone restore                  '
203,0, 1,'Alarm (valve sensor)                           '
203,1, 1,'Valve sensor zone restore                      '
204,0, 1,'Alarm (low water level)                        '
204,1, 1,'Low water level zone restore                   '
205,0, 1,'Alarm (pump activated)                         '
205,1, 1,'Pump stopped                                   '
206,0, 1,'Alarm (pump trouble)                           '
206,1, 1,'Pump OK                                        '
220,0, 1,'Key box open                                   '
220,1, 1,'Key box restore                                '
300,0, 4,'System module trouble                          '
300,1, 4,'System module OK                               '
301,0, 4,'AC supply trouble                              '
301,1, 4,'AC supply trouble restore                      '
302,0, 4,'Low battery voltage                            '
302,1, 4,'Battery OK                                     '
303,0, 0,'RAM memory error                               '
305,0, 4,'Main panel restart                             '
306,0, 0,'Main panel settings reset                      '
306,1, 0,'System settings restored from FLASH memory     '
309,0, 4,'Battery damaged (high resistance)              '
309,1, 4,'Battery OK (resistance OK)                     '
312,0, 1,'Supply output overload                         '
312,1, 1,'Supply output overload restore                 '
330,0, 8,'Proximity card reader trouble                  '
330,1, 8,'Proximity card reader OK                       '
333,0,11,'Communication bus trouble                      '
333,1,11,'Communication bus OK                           '
337,0, 4,'Battery charging trouble                       '
337,1, 4,'Battery charging OK                            '
339,0, 4,'Module restart                                 '
344,0, 4,'Receiver jam detected                          '
344,1, 4,'Receiver jam ended                             '
350,0, 0,'Transmission to monitoring station trouble     '
350,1, 0,'Transmission to monitoring station OK          '
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351,0, 0,'Telephone line troubles                    '
351,1, 0,'Telephone line OK                          '
370,0, 1,'Alarm (auxiliary zone perimeter tamper)    '
370,1, 1,'Auxiliary zone perimeter tamper restore    '
373,0, 1,'Alarm (fire sensor tamper)                 '
373,1, 1,'Fire sensor tamper restore                 '
380,0, 1,'Zone trouble (masking)                     '
380,1, 1,'Zone OK (masking)                          '
381,0,32,'Radio connection troubles                  '
381,1,32,'Radio connection OK                        '
383,0, 1,'Alarm (zone tamper)                        '
383,1, 1,'Zone tamper restore                        '
384,0,32,'Low voltage on radio zone battery          '
384,1,32,'Voltage on radio zone battery OK           '
388,0, 1,'Zone trouble (masking)                     '
388,1, 1,'Zone OK (masking)                          '
400,0, 2,'Disarm                                     '
400,1, 2,'Arm                                        '
401,0, 2,'Disarm by user                             '
401,1, 2,'Arm by user                                '
403,0,15,'Auto-disarm                                '
403,1,15,'Auto-arm                                   '
404,0, 2,'Late disarm by user                        '
404,1, 2,'Late arm by user                           '
405,1, 2,'Deferred arm by user                       '
406,0, 2,'Alarm cleared                              '
407,0, 2,'Remote disarm                              '
407,1, 2,'Remote arm                                 '
408,1, 1,'Quick arm                                  '
409,0, 1,'Disarm by zone                             '
409,1, 1,'Arm by zone                                '
411,0, 0,'Callback made                              '
412,0, 0,'Downloading successfully finished          '
413,0, 0,'Unsuccessful remote downloading attempt    '
421,0, 3,'Access denied                              '
421,1, 3,'Access denied                              '
422,0, 3,'User access                                '
422,1, 3,'User access                                '
423,0, 1,'Alarm - armed partition door opened        '
441,1, 2,'Arm (STAY mode)                            '
442,1, 1,'Arm by zone (STAY mode)                    '
454,0, 2,'Arming failed                              '
458,0, 2,'Delay activation time started              '
461,0, 1,'Alarm (3 wrong access codes)               '
462,0, 3,'Guard round                                '
462,1, 3,'Guard round                                '
570,0, 1,'Zone bypass                                '
570,1, 1,'Zone unbypass                              '
571,0, 1,'Fire zone bypass                           '
571,1, 1,'Fire zone unbypass                         '
572,0, 1,'24h zone bypass                            '
572,1, 1,'24h zone unbypass                          '
573,0, 1,'Burglary zone bypass                       '
573,1, 1,'Burglary zone unbypass                     '
574,0, 1,'Group zone bypass                          '
574,1, 1,'Group zone unbypass                        '
575,0, 1,'Zone auto-bypassed (violations)            '
575,1, 1,'Zone auto-unbypassed (violations)          '
601,0, 6,'Manual transmission test                   '
602,0, 0,'Transmission test                          '
604,0, 2,'Fire/technical zones test                  '
604,1, 5,'End of fire/technical zones test           '
607,0, 2,'Burglary zones test                        '
607,1, 5,'End of burglary zones test                 '
611,0, 1,'Zone test OK                               '
612,0, 1,'Zone not tested                            '
613,0, 1,'Burglary zone test OK                      '
614,0, 1,'Fire zone test OK                          '
615,0, 1,'Panic zone test OK                         '
621,0, 0,'Reset of event log                         '
622,0, 0,'Event log 50% full                         '
623,0, 0,'Event log 90% full                         '
625,0, 6,'Setting system real-time clock             '
625,1, 0,'System real-time clock trouble             '
627,0, 4,'Service mode started                       '
628,0, 4,'Service mode finished                      '
966,0, 4,'Duplicate IP address conflict              '
966,1, 4,'Restore of duplicate IP address conflict   '
967,0,14,'CLIP received                              '
968,0, 1,'No connection                              '
968,1, 1,'Connection OK                              '
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 969,0, 4,'Wireless keypad battery low                  '
 969,1, 4,'Wireless keypad battery OK                   '
 970,0, 4,'Connection started                           '
 971,0, 4,'GSM SIM1 account credit low                  '
 971,1, 4,'GSM SIM1 account credit OK                   '
 972,0, 4,'GSM SIM2 account credit low                  '
 972,1, 4,'GSM SIM2 account credit OK                   '
 979,0, 4,'Error of MAC/IMEI/ID for SATEL server        '
 979,1, 4,'MAC/IMEI/ID for SATEL server OK              '
 980,0, 4,'No connection with SATEL server              '
 980,1, 4,'Connection with SATEL server OK              '
 981,0, 6,'GSM module restart                           '
 982,0, 6,'Change of user telephone code                '
 983,0, 6,'User telephone code broken                   '
 984,0, 1,'Alarm - ABAX device tamper (no connection)   '
 984,1, 1,'ABAX device tamper restore (connection OK)   '
 985,0,15,'Exit delay started                           '
 986,0, 1,'Warning alarm                                '
 987,0, 2,'Warning alarm cleared                        '
 988,0, 1,'Arming aborted                               '
 989,0, 7,'User logged in (INT-VG)                      '
 989,1, 7,'User logged out (INT-VG)                     '
 990,0, 4,'No connection with KNX system                '
 990,1, 4,'Connection with KNX system OK                '
 991,0, 1,'Zone auto-bypassed (tamper violations)       '
 991,1, 1,'Zone auto-unbypassed (tamper violations)     '
 992,0, 6,'Confirmed troubles                           '
 993,0, 6,'Confirmed use of RX key fob with low batt.   '
 994,0, 6,'Confirmed use of ABAX key fob with low batt. '
 995,0, 3,'Remote RX key fob with low battery used      '
 995,1, 3,'Remote RX key fob with low battery used      '
 996,0, 3,'Remote ABAX key fob with low battery used    '
 996,1, 3,'Remote ABAX key fob with low battery used    '
 997,0, 4,'Long transmitter busy state                  '
 997,1, 4,'Restore of long transmitter busy state       '
 998,0, 0,'Transmission test (station 1)                '
 999,0, 0,'Transmission test (station 2)                '
1000,0, 1,'Trouble (zone)                               '
1000,1, 1,'Trouble restore (zone)                       '
1001,0, 2,'Forced arming                                '
1002,0, 4,'No network (PING test)                       '
1002,1, 4,'Network OK (PING test)                       '
1003,0, 2,'Arming aborted                               '
1004,0, 0,'Downloading started from ETHM/GSM module     '
1005,0, 6,'ETHM-1-downloading started                   '
1006,0, 4,'Current battery test - absent/low voltage    '
1006,1, 4,'Current battery test - OK                    '
1007,0, 1,'Exit delay started                           '
1008,0, 2,'Exit delay started                           '
1009,0,14,'SMS control - begin                          '
1009,1,14,'SMS control - end                            '
1010,0,14,'SMS with no control received                 '
1011,0,14,'SMS from unauthorized telephone received     '
1012,0, 6,'CSD-downloading started                      '
1013,0, 6,'GPRS-downloading started                     '
1014,0, 4,'No signal on DSR input                       '
1014,1, 4,'Signal on DSR input OK                       '
1015,0, 4,'Time server error                            '
1015,1, 4,'Time server OK                               '
1016,0, 6,'Time synchronization started                 '
1017,0, 9,'SMS messaging OK                             '
1018,0, 9,'SMS messaging failed                         '
1019,0, 3,'Remote key fob used                          '
1019,1, 3,'Remote key fob used                          '
1020,0, 4,'LCD/PTSA/ETHM-1 initiation error             '
1021,0, 4,'LCD/PTSA/ETHM-1 initiation OK                '
1022,0, 0,'Downloading request from ETHM-1/INT-GSM      '
1023,0, 6,'Tamper info cleared                          '
```

The meaning of nnnnnnnn field:

- if users numbering:
  - 1..240 - user
  - 241..248 - master
  - 249 - INT-AV
  - 250 - ACCO NET
  - 251 - SMS
  - 252 - timer
  - 253 - function zone
  - 254 - Quick arm
  - 255 - service

- if zone|expander|keypad numbering:
  - 1..128 - zone
  - 129..192 - expander at address 0..63

  INTEGRA 24 and 32:
  - 193..196 - real LCD keypads or INT-RS modules at address 0..3
  - 197..200 - keypad in GUARDX connected to LCD keypad at address 0..3, or www keypad in internet browser connected to ETHM-1 at address 0..3
  - 201 - keypad in DLOADX connected to INTEGRA via RS cable
  - 202 - keypad in DLOADX connected to INTEGRA via TEL link (modem)

  INTEGRA 64, 128, 128-WRL, 64 Plus, 128 Plus and 256 Plus:
  - 193..200 - real LCD keypads or INT-RS modules at address 0..7
  - 201..208 - keypad in GUARDX connected to LCD keypad at address 0..7, or www keypad in internet browser connected to ETHM-1 at address 0..7
  - 209 - keypad in DLOADX connected to INTEGRA via RS cable
  - 210 - keypad in DLOADX connected to INTEGRA via TEL link (modem)
- if output|expander numbering:
  - 1..128 - output
  - 129..192 - supply output in expander at address 0..63

Note: in INTEGRA 256 Plus - if event record describes zone or output (1..128), so read the uuuuu field and:
if uuuuu = 00000 - the zone or output number is 1..128,
if uuuuu = 00001 - add 128 to the zone or output number - i.e. 1..128 becomes 129..256.

Appendix 2 - kind of long description

Kind of long description:
0 - no additional description
1 - partition/zone|expander|keypad
2 - partition/user
3 - partition keypad/user (partition keypad address in PPPPPR) (not LCD keypad, but LED partition keypad, e.g. INT-S)
4 - zone|expander|keypad
5 - partition
6 - keypad/user
7 - user
8 - expander reader head
9 - telephone
10 - output of telephone relay type
11 - partition/data bus
12 - partition/output|expander (partition not important for main panel outputs)
13 - partition/output|expander (partition not important for outputs)
14 - telephone in PPPPP/user (telephone: 0 - unknown, 1.. - phone number)
15 - partition/timer
30 - beginning of TCP/IP address (keypad address in PPPPP)
31 - 3rd and 4th bytes of TCP/IP address
32 - partition/zone or ABAX output

Appendix 3 - kind of short description

Kind of short description (just another kind of event description) - 2 bytes: MrIRoDnT gtwmkues of the following bit meaning:
s - partition
e - zone/expander/LCD-keypad
u - user
k - expander in RPPPPP
m - LCD-keypad in PPPPP
w - output/expander, partition only for expanders
t - timer
g - proximity card reader
T - telephone
n - number (RAM error)
D - data bus (0=DTM, 1=DT1, 2=DT2, 129..128+IL_EXPAND=expander)
o - call back (0='SERV', 1='SERV=', 2='USER', 3='USER=', 4='ETHM-modem', 5='ETHM-RS')
R - telephone relay
I - TCP/IP event (2 records !!!)
r - ABAX input/output, partition only for input
M - monitoring

Appendix 4 - crc calculation example

Assume that the following data has to be send to INT-RS module: 0xE0, 0x12, 0x34, 0xFF, 0xFF (i.e. read information about user with 1234 code). For this case the following frame should be generated:

0xFE	0xFE	0xE0	0x12	0x34	0xFF	0xFF	0x8A	0x9B	0xFE	0x0D

The 16-bit crc sum calculation goes as below:

1) crc := 0x147A
2) for byte b = 0xE0:
   - crc := rl(crc) = rl(0x147A) = 0x28F4
   - crc := crc xor 0xFFFF = 0x28F4 xor 0xFFFF = 0xD70B
   - crc := crc + crc.high + b = 0xD70B + 0xD7 + 0xE0 = 0xD8C2
3) for byte b = 0x12:
   - crc := rl(crc) = rl(0xD8C2) = 0xB185
   - crc := crc xor 0xFFFF = 0xB185 xor 0xFFFF = 0x4E7A
   - crc := crc + crc.high + b = 0x4E7A + 0x4E + 0x12 = 0x4EDA
4) for byte b = 0x34:
   - crc := rl(crc) = rl(0x4EDA) = 0x9DB4
   - crc := crc xor 0xFFFF = 0x9DB4 xor 0xFFFF = 0x624B
   - crc := crc + crc.high + b = 0x624B + 0x62 + 0x34 = 0x62E1
5) for byte b = 0xFF:
   - crc := rl(crc) = rl(0x62E1) = 0xC5C2
   - crc := crc xor 0xFFFF = 0xC5C2 xor 0xFFFF = 0x3A3D
   - crc := crc + crc.high + b = 0x3A3D + 0x3A + 0xFF = 0x3B76
6) for byte b = 0xFF:
   - crc := rl(crc) = rl(0x3B76) = 0x76EC
   - crc := crc xor 0xFFFF = 0x76EC xor 0xFFFF = 0x8913
   - crc := crc + crc.high + b = 0x8913 + 0x89 + 0xFF = 0x8A9B

And the final crc sum is 0x8A9B.

Appendix 5 - languages

List of language coding used in INTEGRA is given in the table below. The table contains countries instead of languages in fact. One exception is EN which stands for language, not country.

0	PL	Poland
1	EN	English
2	UA	Ukraine
3	RU	Russia
4	DE	Germany
5	SK	Slovakia
6	IT	Italy
7	CZ	Czech
8	HU	Hungary
9	NL	Netherlands
10	IE	Ireland
11	NO	Norway
12	DK	Denmark
13	IS	Iceland
14	GR	Greece
15	FR	France
16	ES	Spain
17	PT	Portugal
18	FI	Finland
19	SI	Slovenia
20	SE	Sweden
21	TR	Turkey
22	RO	Romania
23	EE	Estonia
24	BG	Bulgaria
25	LV	Latvia
26	MK	Macedonia
27	RS	Serbia
28	AL	Albania
29	AU	Australia
30	LT	Lithuania
255	UN	unspecified / universal

Revision history

Document date	Changes
2014-04-16	Previous release
2015-03-19	Updated INTEGRA event list (Appendix 1) Expanded 0x7F command Expanded 0xEE command (device types 6, 7, 15 and 16)
2018-01-11	Updated INTEGRA event list (Appendix 1) Added 0x30 and 0x31 commands Expanded 0x7C command Expanded 0x7F command Expanded device list in 0xEE command
2018-02-19	Changed description for command 0x8C (S1,S2)
2019-09-11	Changed description for commands 0x09, 0x0A and 0x21
2020-01-23	Changed description for command 0xEE
2020-03-05	Added Appendix 5
2020-09-02	Extended troubles description
2020-11-03	Expanded 0x80, 0x81, 0x82, 0x83, 0xA0, 0xA1, 0xA2 and 0xA3 commands
2022-01-20	Added 0x7B command
2023-02-22	Module adapted to work with new INTEGRA firmware (>= 1.21 2023-02-21) Added device type 19 to read in 0xEE command