Brand	⌂ Ariston
Type	NUOS 250 EXT SOL
MainBoard	Janus 2
SW Version	010204
Production Year	2011
Serial Settings HMI2Main	9600 8N1 @5V! Use TTL Converter!)
Communication	Between Mainboard and HMI Board

Wiring Main2HMI
Mainbaord to HMI Board

Board to Board Connector, blue wires

	HMI Board	Mainboard
Pin1	GND	GND
Pin2	VCC 5V	VCC 5V
Pin3	TXD31 Pin35@Renesas H8/38347	RXD1 Pin9@Renesas R8C/27
Pin4	RXD31 Pin34@Renesas H8/38347	TXD1 Pin2@Renesas R8C/27
Pin5	NC	NC
Pin6	NC	NC

Wiring Main2External
Official Flash/Test Connector

6P6C RJ-12 Connector Serial Port

	Mainboard	Pinning
Pin1	TXD0	Pin17@Renesas R8C/27
Pin2	RXD0	Pin16@Renesas R8C/27
Pin3	VCC	
Pin4	GND	
Pin5	MODE	Pin8@Renesas R8C/27
Pin6	RESET	Pin3@Renesas R8C/27

Temperature Encoding Example

Byte Position in transmission	⓪①	②③
Example Data ASCII	40	33
	Decimal Places in 1/255 °C	Temperature in °C
	0x33 + 0x40/0xFF = 51.25°C 51°C + 0.2509 °C = 51.25°C	
Errors	FE7F=Sensor not connected	

LRC Checksum - Logitudinal Redundancy Check

1 byte sum over all transmitted bytes after STX (including ETX)

Example ASCII	␂	Á	0	0	7	0	0	0	1	1	A	␃	8	E
HEX		C1	30	30	37	30	30	30	31	31	41	03	38	45
Sum 1Byte		0xC1+0x30+0x30+0x37+0x30+0x30+0x30+0x31+0x31+0x41+0x03=0x028E 0x028E AND 0xFF = 0x8E											**8E**	

Function IDs

TargetTemp	0x00	on menu action
OnOff	0x01	OnOff Button
Unknown02	0x02	
Status	0x03	cyclic status msg 1s, in regular operation
Errors	0x04	cyclic status msg 1s, if errors present
T_Max	0x05	on menu action
T_Min	0x06	on menu action
Settings	0x07	on menu action
SW_MB	0x08	on menu action
RESET_ALL	0x09	Action to reset all Settings
TW1	0x0A	on menu action
TW2	0x0B	on menu action
T_AIR	0x0C	on menu action
T_EVAP	0x0D	on menu action
TW3	0x0E	on menu action
Unknown0F	0x0F	
HP_h	0x10	on menu action

HE_h	0x11	on menu action
T_HP	0x12	on menu action
Unknown13	0x13	
Time_W	0x14	on menu action

Glossar	
NUL	Null 0x00
DATA	Transmisson Example
STX ␂	Start of Text Character = 0x02
ETX ␃	End of Text Character = 0x03
CR ␍	Carriage Return = 0x0D
Len	Length
NULL	NULL/Padding or **Unknown** Byte Usage
LRC	Longitudinal Redundancy Check
MSGT	Message Type
FKT	Function ID
DATA	Data Payload
POS	Byte Position in Transmission
HMI	Human Machine Interface
Main2HMI	Transmission from Mainboard to HMI Board
HMI2Main	Transmission from HMI Board to Mainboard

Reverse Engineering by Guessing/Testing

Direction	Function	Transmission Example
Main2HMI	Status	␂ Á00300090032000FE7F00010001 ␃ CF ␍

⓪	①		②③④	⑤⑥	⑦⑧	⑨⑩⑪⑫	⑬⑭	⑮⑯⑰⑱	⑲⑳	①②	③④	⑤⑥	⑦	⑧⑨	⑩
0x02	0xC1		003	00	09	0032	00	FE7F	00	01	00	01	0x03	CF	CR
STX	MSGT		003=Status	00	Length	Target Temp 50.00°C	00	Dome Temp TW3 FE7F=Sensor Not Connected	00 Status1 ???	Status2	Status3 Mode	Status4	ETX	LRC	CR

Hex	Status1
0x00	??
0x01	??
...	...

Hex	Program
0x00	Boost
0x01	Green
0x02	Voyage
0x03	Auto
...	...

Hex		Symbol
0x00	OFF	
0x01	ON	
0x02	HP	Heat Pump Fan
0x04	HE	Heat Element
0x08		
...	...	
0x??	Defrost	

Hex	Status4
0x00	??
0x01	??
0x02	??
0x03	??
...	...

Direction	Function	Transmission Example
Main2HMI	Error	␂ Á00400040040A0240 ␃ B7 ␍

⓪	①		②③④	⑤⑥	⑦⑧	⑨⑩	⑪⑫	⑬⑭	⑮⑯	⑰	⑱⑲	⑳
0x02	0xC1		004	00	04	00	4A	02	40	0x03	B7	CR
STX	MSGT		004=Error	00	Length					ETX	LRC	CR

Errorbits1		
Bit	**Desc.**	**Device Error**
0x01	T_Air sensor short	H7
0x02	T_Air sensor open	H7
0x04	T_Evap sensor short	H6
0x08	T_Evap sensor open	H6
0x10	unknown EB1 0x10	
0x20	unknown EB1 0x20	

Errorbits2		
Bit	**Desc.**	**Device Error**
0x01	unknown	
0x02	Gaspressure Sensor	H1
0x04	unknown	
0x08	unknown	
0x10	unknown	
0x20	unknown	
0x40	unknown	
0x80	unknown	

Errorbits3		
Bit	**Desc.**	**Device Error**
0x01	TW1 Tank Sensor Pin2 short	H8
0x02	TW1 Tank Sensor Pin2 open	H8
0x04	TW2 Tank Sensor Pin4 short	H8
0x08	TW2 Tank Sensor	H8

0x40	TW3 sensor open	H8
0x80	TW3 sensor short	E4,H8

	Pin4 open	
0x10	unknown	
0x20	Anode	F5
0x40	Empty Tank	F4
0x80	unknown	

Main2HMI	Settings	␂ Á00700010A ␃ 8D ␍							
		⓪	①	②③④	⑤⑥	⑦⑧	⑨⑩	⑪	⑫⑬	⑭
		0x02	0xC1	007	00	01	0A	0x03	8D	CR
		STX	MSGT	007=Settings	00	Length	SettingBits (see below)	ETX	LRC	CR

SettingBits	
AntiBact	0x01
GreenMode	0x02
Voyage	0x04
Defrost	0x08
HP_NC	0x10
Unknown	0x20
Unknown	0x40
Unknown	0x80

Main2HMI	Temperature T_Max	␂ Á00500020041 ␃ E0 ␍
Main2HMI	Temperature T_Min	␂ Á00600020028 ␃ E6 ␍
Main2HMI	Temperature TW1	␂ Á00A0002FE7F ␃ 2F ␍
Main2HMI	Temperature TW2	␂ Á00B0002FE7F ␃ 30 ␍
Main2HMI	Temperature T_AIR	␂ Á00C00022215 ␃ F3 ␍
Main2HMI	Temperature T_EVAP	␂ Á00D00020024 ␃ F0 ␍
Main2HMI	Temperature TW3	␂ Á00E0002FF7F ␃ 34 ␍
Main2HMI	Temperature T_HP	␂ Á01200020033 ␃ DF ␍

⓪	①		②③④	⑤⑥	⑦⑧	⑨⑩⑪⑫	⑬	⑭⑮	⑯
0x02	0xC1		005	00	02	0041	0x03	E0	CR
STX	MSGT		Temperature (see below)	00	Length	Temperature Encoding Example (see below)	ETX	LRC	CR

Temperature	
005	T_Max
006	T_Min
00A	TW1
00B	TW2
00C	T_AIR
00D	T_EVAP
00E	TW3
012	T_HP

Temperature Encoding Example

09	12
40	33
Decimal Places?	Temperature in °C

0x33 + 0x40/0xFF = 51.25°C

Main2HMI	Confirm On/Off	␂ Á10010001 ␃ 48 ␍							
		⓪	①	②	③④⑤	⑥⑦	⑧⑨	⑩	⑪⑫	⑬
		0x02	0xC2	1	001	00	01	0x03	48	CR
		STX	MSGT	len?	Confirm On/Off	00	0x00=OFF? 0x01=ON?	ETX	LRC	CR

Main2HMI	Confirm Setting	␂ Á1007000A ␃ 5E ␍							
		⓪	①	②	③④⑤	⑥⑦	⑧⑨	⑩	⑪⑫	⑬
		0x02	0xC2	1	007	00	0A	0x03	5E	CR
		STX	MSGT	len?	Confirm Setting	00	See SETTINGS	ETX	LRC	CR

Main2HMI	Confirm Temp	␂ Á2005000042 ␃ B2␍

Main2HMI	Confirm Temp	␂ Â2006000028 ␃ B7␍									
		⓪	①	②	③④⑤	⑥⑦	⑧⑨⑩⑪	⑫	⑬⑭	⑮	
		0x02	0xC2	2	005	00	0042	0x03	B2	CR	
		STX	MSGT	len?	Confirm Temperature Setting 005 T_Max 006 T_Min 00A TW1 00B TW2 00C T_AIR 00D T_EVAP 00E TW3 012 T_HP	00	See Temperatures	ETX	LRC	CR	
Main2HMI	RESET	␂ Â10090001 ␃ 50 ␍									
		⓪	①	②	③④⑤	⑥⑦	⑧⑨	⑩	⑪⑫	⑬	
		0x02	0xC2	1	009	00	01	0x03	7E	CR	
		STX	MSGT	len?	009=RESET_ALL	00	Data	ETX	LRC	CR	
Main2HMI	SW Version Mainboard	␂ Â0080003010204 ␃ 46␍									
		⓪	①		②③④	⑤⑥	⑦⑧	⑨⑩⑪⑫⑬⑭	⑮	⑯⑰	⑱
		0x02	0xC1		008	00	03	010204	0x03	46	CR
		STX	MSGT		008=Version	00	Length	Version = "010204"	ETX	LRC	CR
Main2HMI	HP_h	␂ Â0100004755B0000 ␃ BC ␍									
Main2HMI	HE_h	␂ Â0110004631A0000 ␃ B5 ␍									
		⓪	①		②③④	⑤⑥	⑦⑧	⑨⑩⑪⑫⑬⑭⑮⑯	⑰	⑱⑲	⑳
		0x02	0xC1		010	00	04	755B0000	0x03	BC	CR
		STX	MSGT		010 HP_h 011 HE_h		Length	0x00005B75 /60min = 390 hours	ETX	LRC	CR
Main2HMI	Time_W	␂ Â014000108 ␃ 82 ␍									
		⓪	①		②③④	⑤⑥	⑦⑧	⑨⑩	⑪	⑫⑬	⑭
		0x02	0xC1		014	00	01	08	0x03	82	CR
		STX	MSGT		014=Time_W	00	Length	Time in h 8 hours	ETX	LRC	CR
Main2HMI	RESET	␂ Â009000100 ␃ 7E ␍									
		⓪	①		②③④	⑤⑥	⑦⑧	⑨⑩	⑪	⑫⑬	⑭
		0x02	0xC1		009	00	01	00	0x03	7E	CR
		STX	MSGT		009=RESET_ALL		Length	?	ETX	LRC	CR
HMI2Main	Get Settings	0xff 0xff 0xff 0xff 0xff 0xff 0xff ␂ 0xC1 0070001 ␃ 1C ␍									
		⓪	①		②③④	⑤⑥	⑦⑧	⑨	⑩⑪	⑫	
		0x02	0xC1		007	00	01	0x03	1C	CR	
		STX	MSGT		007=Settings		Length??	ETX	LRC	CR	