FieldServer Driver
FS-8700-100
Heatcraft-Smart Controller II

Description

The FieldServer Heatcraft Smart Controller II (HCSCII) driver has the following functionality:

1) Status monitoring of Heatcraft Smart Controller II (HCSCII).
2) Set system parameters.
3) Read logged data and error/alarm log.

Status monitoring is achieved by storing system parameters and data for the HSCII in data arrays on the FieldServer. These may be read from the FieldServer by other devices serving other protocols.
Detailed information on the data array offset for a particular parameter or data is provided in the driver manual.

System Control commands can be issued to set system parameters. Two methods for configuring these System commands are provided for this operation (See Driver Manual for details).

The Driver can read and store logged data into a data array. The data is stored sequentially in the data array with the most recently logged information appearing first.

Fieldserver Mode	Nodes	Comments
Client	1	The FieldServer can support one Smart Controller device or Main communication hub per port. A Main communication hub can be connected to up to four Smart Controllers or secondary communication hubs. Each secondary communication hub can support up to four Smart Controllers. Thus the FieldServer can support a maximum of 16 Smart Controllers per port with the use of one main and four secondary communication hubs.
Server	32	*[e.g: This is the limit per i/net panel. The 32 nodes correspond to the maximum of 32 mr's that an i/net panel supports.]*

Formal Driver Type

Serial
Client or Server

Compatibility Matrix

FieldServer Model	Compatible with this driver
FS-x2010	Yes
FS-x2011	Yes
FS-x40	Yes
FS-x30	No

Connection Information

Connection type: EIA232
Baud Rates: 38400 (vendor limitation)
Data Bits: **8**
Stop Bits: **1**,
Parity: None
Multidrop Capability No

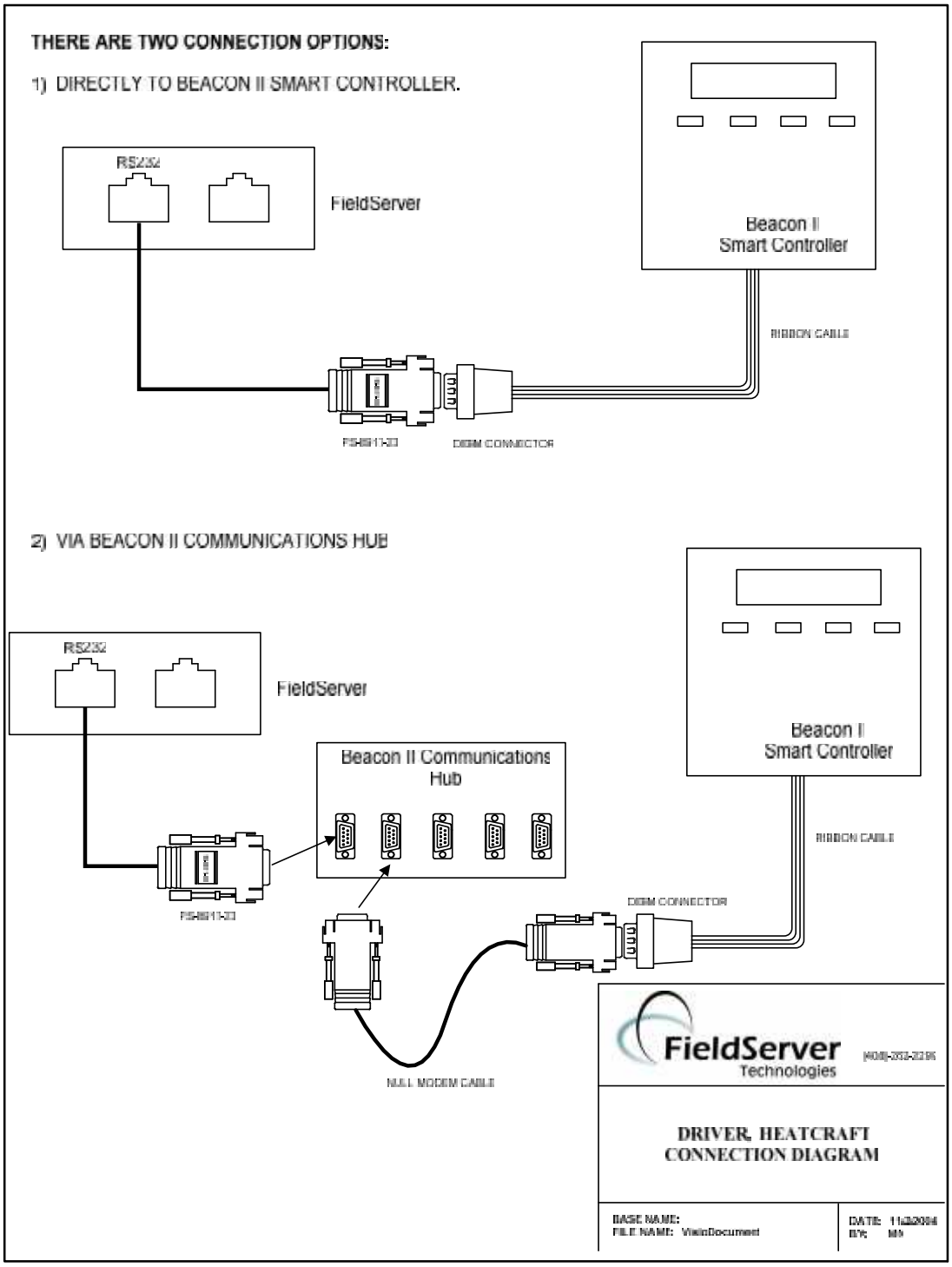
Proprietary Physical Interfaces Supported

Fieldserver Model	Adapter Model #	Vendor	Physical Medium

Devices tested

Device	Tested (FACTORY, SITE)

Connection configurations



Communications functions - Supported functions at a glance:

The FieldServer can be configured as a client to issue commands to read system parameters/data or to set system parameters. The following commands can be issued when FieldServer is configured as a client. (**Note.** Spare commands do not have their English names at the time of development but can be issued by using their hex representation. Driver will store and send data without any manipulation.)

General Commands:

These commands are used to start communication. On detection of a DTR signal on the serial connection, the Smart Controller issues a "Password Challenge" command. Once the correct information is received from the FieldServer, the data on the Smart Controller is accessible for reading by the FieldServer. All System Parameter Commands (write commands) will be ignored by the Smart Controller until the "Validate Password" command is received from the FieldServer. The "Set Password" command can be used to override the Smart Controller default password.

Cmd(hex)	Cmd (Keywords)	Legal Values
60	Set All Sub Operating Modes	0 = "Off"; 1 = "Cooling"; 3 = "Defrost"; 4 = "Drain"; No change if > 7 (such as 0FFH)
61	Password Challenge	
62	Validate Password	
63	Set Password	
64…67		Spare

System Parameter Commands

These commands are used to write data to the Smart Controller device.

Cmd (Hex)	Cmd (keyword)	Legal Values
68	Set All Desired Box Temps	-30 to +70F
69	Set All Defrost Override Times	10 through 200 minutes
6A	Set All Alarm High Limit Temps	-40 to +80F
6B	Set All Alarm Low Limit Temps	-40 to +80F
6C	Set All Alarm Duration Times	2 to 120 minutes
6D	Set All Refrigerant Types	"R22" = 0, "R404" = 1, "R507" = 2
6E	Set All NV Modes	Bit 0 = Deg. F/C, Bit 1 = 12/24 Bit 2 = Normal / Demand Defrost Bit 4 = Air / Electric Def. Bit 6 = service off / service on Bit 7 = Unlock / Lock Param.
6F	Set Sub #1 Desired Superheats	+4 to +20 F
70	Set Sub #2 Desired Superheats	+4 to +20 F
71	Set Sub #3 Desired Superheats	+4 to +20 F
72	Set Sub #4 Desired Superheats	+4 to +20 F
73	Set Sub #1 Defrost Termination Temps	+40 to +100 F

Cmd (Hex)	Cmd (keyword)	Legal Values
74	Set Sub #2 Defrost Termination Temps	+40 to +100 F
75	Set Sub #3 Defrost Termination Temps	+40 to +100 F
76	Set Sub #4 Defrost Termination Temps	+40 to +100 F
77	Set Sub #1 Defrost Start Times 1 to 4	10 to 235, or 255 (none)
78	Set Sub #1 Defrost Start Times 5 to 8	10 to 235, or 255 (none)
79	Set Sub #1 Defrost Start Times 9 to 12	9 to 12: 10 to 235, or 255 (none)
7A	Set Sub #2 Defrost Start Times 1 to 4	1 to 4: 10 to 235, or 255 (none)
7B	Set Sub #2 Defrost Start Times 5 to 8	5 to 8: 10 to 235, or 255 (none)
7C	Set Sub #2 Defrost Start Times 9 to 12	9 to 12: 10 to 235, or 255 (none)
7D	Set Sub #3 Defrost Start Times 1 to 4	1 to 4: 10 to 235, or 255 (none)
7E	Set Sub #3 Defrost Start Times 5 to 8	5 to 8: 10 to 235, or 255 (none)
7F	Set Sub #3 Defrost Start Times 9 to 12	9 to 12: 10 to 235, or 255 (none)
80	Set Sub #4 Defrost Start Times 1 to 4	1 to 4: 10 to 235, or 255 (none)
81	Set Sub #4 Defrost Start Times 5 to 8	5 to 8: 10 to 235, or 255 (none)
82	Set Sub #4 Defrost Start Times 9 to 12	9 to 12: 10 to 235, or 255 (none)
83-88	83 – 88	Spares

System Parameter requests

These commands are used to read system parameters (readable and write memory area).

Cmd(hex)	Cmd (Keyword)	Data Returned
89	Read All Desired Box Temps	-30 to +70 F
8A	Read All Defrost Override Times	10 through 200 minutes
8B	Read All Alarm High Limit temps	-40 to +80 F
8C	Read All Alarm Low Limit temps	-40 to +80 F
8D	Read All Alarm Duration times	2 to 120 minutes
8E	Read All Refrigerant Types	"R22" = 0, "R404" = 1, "R507" = 2
8F	Read All NV Modes	Bit 0 = Deg. F/C, Bit 1 = 12/24 Bit 2 = Normal / Demand Defrost Bit 4 = Air / Electric Def. Bit 6 = Service Off/ Service On Bit 7 = Unlock / Lock Param.
90	Read Sub #1 Desired Superheats	+4 to +20 F
91	Read Sub #2 Desired Superheats	+4 to +20 F
92	Read Sub #3 Desired Superheats	+4 to +20 F
93	Read Sub #4 Desired Superheats	+4 to +20 F
94	Read Sub #1 Defrost Termination Temps	+40 to +100 F
95	Read Sub #2 Defrost Termination Temps	+40 to +100 F
96	Read Sub #3 Defrost Termination Temps	+40 to +100 F
97	Read Sub #4 Defrost Termination Temps	+40 to +100 F
98	Read Sub #1 Defrost Start Times 1 to 4	10 to 235, or 255 (none)
99	Read Sub #1 Defrost Start Times 5 to 8	10 to 235, or 255 (none)
9A	Read Sub #1 Defrost Start Times 9 to 12	10 to 235, or 255 (none)

Cmd(hex)	Cmd (Keyword)	Data Returned
9B	Read Sub #2 Defrost Start Times 1 to 4	10 to 235, or 255 (none)
9C	Read Sub #2 Defrost Start Times 5 to 8	10 to 235, or 255 (none)
9D	Read Sub #2 Defrost Start Times 9 to 12	10 to 235, or 255 (none)
9E	Read Sub #3 Defrost Start Times 1 to 4	10 to 235, or 255 (none)
9F	Read Sub #3 Defrost Start Times 5 to 8	10 to 235, or 255 (none)
A0	Read Sub #3 Defrost Start Times 9 to 12	10 to 235, or 255 (none)
A1	Read Sub #4 Defrost Start Times 1 to 4	10 to 235, or 255 (none)
A2	Read Sub #4 Defrost Start Times 5 to 8	10 to 235, or 255 (none)
A3	Read Sub #4 Defrost Start Times 9 to 12	10 to 235, or 255 (none)
A4 – A9	A4 – A9	Spares

System Data Requests

Used to request system data (read only).

Cmd(hex)	Cmd (Keyword)	Data Returned
AAh	Read All Master Addresses And Units	Units in 3 MSBits, Master addresses in 5 LSBits
ABh	Read Main And IO Processor Firmware Ver	Major and Minor revision numbers (major *10 + minor)
ACh	Read Sub #1 Accumulated Comp Run Time	Hours * 10, Seconds * .5
ADh	Read Sub #2 Accumulated Comp Run Time	Hours * 10, Seconds * .5
AEh	Read Sub #3 Accumulated Comp Run Time	Hours * 10, Seconds * .5
AFh	Read Sub #4 Accumulated Comp Run Time	Hours * 10, Seconds * .5
B0h	Read Day Number	(0-255)
B1h	Read Master Mode and Status	"Mode" - Operating mode in 3 LSBits 0=Off; 1=Cooling; 2 = Pumpdown; 3=Defrost, 4=Draining; 5=Delay; 6=Test; 7=Service) Error Status (bit 3); Alarm Status (bit 4); sub-master control (bit 6); Smart Controller present (bit 7)
B2h	Read Master ModeX	Master extended status values "ModeX": optional sensor(s) attached and defrost mode bits (bit packed)
B3h	Read Master Alarm Codes	Master alarm codes "AlrBits" for: room temperature too high or room temperature too low (bit packed) bit 0 set = "Too High" bit 1 set = "Too Low bit 2 set = "Failure to Start"

Cmd(hex)	Cmd (Keyword)	Data Returned
		bit 3 set = "Sensor Failure"
B4h	Read Master Accumulated Comp Cycles	0 to 255
B5h	Read Master Room Temps	-55 to +125 F (-127= "Unknown", -128 = "Comm Error")
B6h	Read Master Outdoor Temps	-55 to +125 F
B7h	Read Sub #1 Suction Temps	-55 to +125 F
B8h	Read Sub #2 Suction Temps	-55 to +125 F
B9h	Read Sub #3 Suction Temps	-55 to +125 F
BAh	Read Sub #4 Suction Temps	-55 to +125 F
BBh	Read Sub #1 Saturated Suction Vapor Temps	-55 to +125 F
BCh	Read Sub #2 Saturated Suction Vapor Temps	-55 to +125 F
BDh	Read Sub #3 Saturated Suction Vapor Temps	-55 to +125 F
BEh	Read Sub #4 Saturated Suction Vapor Temps	-55 to +125 F
BFh	Read Sub #1 Suction Pressures	0 to 150 PSIA
C0h	Read Sub #2 Suction Pressures	0 to 150 PSIA
C1h	Read Sub #3 Suction Pressures	0 to 150 PSIA
C2h	Read Sub #4 Suction Pressures	0 to 150 PSIA
C3h	Read Sub #1 Superheats	-128 to +127 F
C4h	Read Sub #2 Superheats	-128 to +127 F
C5h	Read Sub #3 Superheats	-128 to +127 F
C6h	Read Sub #4 Superheats	-128 to +127 F
C7h	Read Sub #1 Defrost Temps	-128 to +127 F
C8h	Read Sub #2 Defrost Temps	-128 to +127 F
C9h	Read Sub #3 Defrost Temps	-128 to +127 F
CAh	Read Sub #4 Defrost Temps	-128 to +127 F
CBh	Read Sub #1 EXV Positions	0 to 255
CCh	Read Sub #2 EXV Positions	0 to 255
CDh	Read Sub #3 EXV Positions	0 to 255
Ceh	Read Sub #4 EXV Positions	0 to 255
CFh	Read Sub #1 EXV Step Sizes	0 to 255
D0h	Read Sub #2 EXV Step Sizes	0 to 255
D1h	Read Sub #3 EXV Step Sizes	0 to 255
D2h	Read Sub #4 EXV Step Sizes	0 to 255
D3h	Read Sub #1 AC Input	0*5 to 31.4*5 Vac

Cmd(hex)	Cmd (Keyword)	Data Returned
	Voltages	
D4h	Read Sub #2 AC Input Voltages	0*5 to 31.4*5 Vac
D5h	Read Sub #3 AC Input Voltages	0*5 to 31.4*5 Vac
D6h	Read Sub #4 AC Input Voltages	0*5 to 31.4*5 Vac
D7h	Read Sub #1 Last Defrost Elapsed Times	0 to 255 minutes
D8h	Read Sub #2 Last Defrost Elapsed Times	0 to 255 minutes
D9h	Read Sub #3 Last Defrost Elapsed Times	0 to 255 minutes
DAh	Read Sub #4 Last Defrost Elapsed Times	0 to 255 minutes
DBh	Read Sub #1 Error Codes	room temp sensor (bit 0) defrost temp sensor (bit 1) suction temp sensor (bit 2) suction pressure sensor (bit 3) outdoor temp sensor (bit 4) low superheat temperature (Bit 5) compressor shutdown (bit 6)
DCh	Read Sub #2 Error Codes	
DDh	Read Sub #3 Error Codes	
DEh	Read Sub #4 Error Codes	
DFh	Read Sub #1 Firmware Versions	major and minor revisions (major*10 + minor)
E0h	Read Sub #2 Firmware Versions	major and minor revisions (major*10 + minor)
E1h	Read Sub #3 Firmware Versions	major and minor revisions (major*10 + minor)
E2h	Read Sub #4 Firmware Versions	major and minor revisions (major*10 + minor)
DFh	Read Sub #1 Firmware Versions	-55 to +125 F
E0h	Read Sub #2 Firmware Versions	-55 to +125 F
E1h	Read Sub #3 Firmware Versions	-55 to +125 F
E2h	Read Sub #4 Firmware Versions	-55 to +125 F
E3h	Read Sub #1 Spare Temp	-55 to +125 F
E4h	Read Sub #2 Spare Temp	-55 to +125 F
E5h	Read Sub #3 Spare Temp	-55 to +125 F
E6h	Read Sub #4 Spare Temp	-55 to +125 F
E7	E7	Spare

Cmd(hex)	Cmd (Keyword)	Data Returned
E8	E8	Spare
E9	E9	Spare
EA	EA	Spare

Requests for logged errors/alarms

Both commands should be used in pairs.

Cmd(hex)	Data Returned
F4	Current error/alarm que index and length
EB	Selected error/alarm logged record

Requests for logged data

Each group of three commands should be used in conjunction.

Cmd(hex)	Data Returned
F5	Current Subsystem #1 que index and length
EC	Selected Subsystem #1 log data (part 1 of selected record number)
ED	Selected Subsystem #1 log data (part 2 of selected record number)
F6	Current Subsystem #2 que index and length
EE	Selected Subsystem #2 log data (part 1 of selected record number)
EF	Selected Subsystem #2 log data (part 2 of selected record number)
F7	Current Subsystem #3 que index and length
F0	Selected Subsystem #3 log data (part 1 of selected record number)
F1	Selected Subsystem #3 log data (part 2 of selected record number)
F8	Current Subsystem #4 que index and length
F2	Selected Subsystem #4 log data (part 1 of selected record number)
F3	Selected Subsystem #4 log data (part 2 of selected record number)
F9-FE	Spares

Special Keywords and descriptions

These are special commands that have been developed by the driver to read multiple parameters independent of the configuration settings specified in the .CSV file.

"COMMONSET" - Reads all of the following parameters	
All Master Addresses And Units	AA
All Refrigerant Types	8E
All NV Modes	8F
Master Mode and Status	B1
Master ModeX	B2
Master Alarm Codes	B3
Master Accumulated Comp Cycles	B4

Master Room Temps	B5
Master Outdoor Temps	B6
All Desired Box Temps	89
All Defrost Override Times	8A
All Alarm High Limit Temps	8B
All Alarm Low Limit Temps	8C
All Alarm Duration Times	8D
Main And IO Processor Firmware Ver	AB
Day Number	B0
"Only for S1" - Reads all parameters and data for sub system #1 not included in COMMONSET.	
"SYSTEM#1" single command which polls for data from subset1#1 and subset2#1	
"SUBSET1#1" polls for the following data from the first subset only[1]:	
Sub #1 Error Codes	DB
Sub #1 Accumulated Comp Run Time	AC
Sub #1 Desired Superheats	90
Sub #1 Defrost Termination Temps	94
Sub #1 Saturated Suction Vapor Temps	BB
Sub #1 Suction Pressures	BF
Sub #1 Suction Temps	B7
Sub #1 Superheats	C3
Sub #1 Defrost Temps	C7
"SUBSET2#1" polls for the following data from the second subset only[4]	
Sub #1 EXV Positions	CB
Sub #1 EXV Step Sizes	CF
Sub #1 Defrost Start Times 1 to 4	98
Sub #1 Defrost Start Times 5 to 8	99
Sub #1 Defrost Start Times 9 to 12	9A
Sub #1 Last Defrost Elapsed Times	D7
Sub #1 Spare Temp	E3
Sub #1 AC Input Voltages	D3
Sub #1 Firmware Versions	DF
Only for S2: - Reads all parameters and data for sub system #2, not included in COMMONSET.	
"SYSTEM#2" single command which polls for data from subset1#2 and subset2#2	
"SUBSET1#2" polls for the following data from the first subset only[4]:	
Sub #2 Error Codes	DC
Sub #2 Accumulated Comp Run Time	AD
Sub #2 Desired Superheats	91
Sub #2 Defrost Termination Temps	95
Sub #2 Saturated Suction Vapor Temps	BC

[1] Updating time can be controlled seperately for subsets.

[4] Updating time can be controlled seperately for subsets.

Sub #2 Suction Pressures	C0
Sub #2 Suction Temps	B8
Sub #2 Superheats	C4
Sub #2 Defrost Temps	C8
"SUBSET2#2" polls for the following data from the second subset only[4].	
Sub #2 EXV Positions	CC
Sub #2 EXV Step Sizes	D0
Sub #2 Defrost Start Times 1 to 4	9B
Sub #1 Defrost Start Times 5 to 8	9C
Sub #2 Defrost Start Times 9 to 12	9D
Sub #2 Last Defrost Elapsed Times	D8
Sub #2 Spare Temp	E4
Sub #2 AC Input Voltages	D4
Sub #2 Firmware Versions	E0
Only for S3: - Reads all parameters and data for sub system #3, not included in COMMONSET.	
"SYSTEM#3" single command which polls for data from subset1#3 and subset2#3	
"SUBSET1#3" polls for the following data from the first subset only[4]:	
Sub #3 Error Codes	DD
Sub #3 Accumulated Comp Run Time	AE
Sub #3 Desired Superheats	92
Sub #3 Defrost Termination Temps	96
Sub #3 Saturated Suction Vapor Temps	BD
Sub #3 Suction Pressures	C1
Sub #3 Suction Temps	B9
Sub #3 Superheats	C5
Sub #3 Defrost Temps	C9
"SUBSET2#3" polls for the following data from the second subset only[4]..	
Sub #3 EXV Positions	CD
Sub #3 EXV Step Sizes	D1
Sub #3 Defrost Start Times 1 to 4	9E
Sub #3 Defrost Start Times 5 to 8	9F
Sub #3 Defrost Start Times 9 to 12	A0
Sub #3 Last Defrost Elapsed Times	D9
Sub #3 Spare Temp	E5
Sub #3 AC Input Voltages	D5
Sub #3 Firmware Versions	E1
Only for S4: - Reads all parameters and data for sub system #4, not included in COMMONSET.	
"SYSTEM#4" single command which polls for data from subset1#4 and subset2#4	
"SUBSET1#4" polls for the following data from the first subset only[4]:	
Sub #4 Error Codes	DE

[4] Updating time can be controlled seperately for subsets.

Sub #4 Accumulated Comp Run Time	AF
Sub #4 Desired Superheats	93
Sub #4 Defrost Termination Temps	97
Sub #4 Saturated Suction Vapor Temps	BE
Sub #4 Suction Pressures	C2
Sub #4 Suction Temps	BA
Sub #4 Superheats	C6
Sub #4 Defrost Temps	CA
"SUBSET2#4" polls for the following data from the second subset only[4].	
Sub #4 EXV Positions	CE
Sub #4 EXV Step Sizes	D2
Sub #4 Defrost Start Times 1 to 4	A1
Sub #4 Defrost Start Times 5 to 8	A2
Sub #4 Defrost Start Times 9 to 12	A3
Sub #4 Last Defrost Elapsed Times	E6
Sub #4 Spare Temp	DA
Sub #4 AC Input Voltages	D6
Sub #4 Firmware Versions	E2
ERR_ALARM_LOG - Reads error/alarm log data. F4 & EB commands handled in conjunction.	
The driver reads logged data on the Smart Controller starting with 0th record and stores it internally until it reaches the latest record. At this point, the driver updates the FieldServer putting the latest record in the first position. When the driver and FieldServer are synchronized, the driver updates the FieldServer with the latest records as they become available.	
DATA_LOG_?- Reads logged data for sub systems from Smart Controller	
DATA_LOG_1 captures logged data for system 1 DATA_LOG_2 captures logged data for system 2 DATA_LOG_3 captures logged data for system 3 DATA_LOG_4 captures logged data for system 4 The driver reads logged data on the Smart Controller starting with 0th record and stores it internally until it reaches the latest record. At this point, the driver updates the FieldServer putting the latest record in the first position. When the driver and FieldServer are synchronized, the driver updates the FieldServer with the latest records as they become available..	

Driver Limitations & Exclusions

1. The FieldServer cannot be connected to the Smart Controller II through a Modem.
2. When initiating the storage of logged data, the FieldServer is updated with all logged data. This may take some time depending on the current que index (number of records available after the 0th record)
3. The Server is not able to resend the Password Challenge (#61) once it has received a response for this command.

4. The FieldServer will not capture error/alarm records if the number of records exceeds 2000 or data log records if the number of records exceeds 4000 per system per Smart Controller.
5. System Control Commands can be issued to set system parameters. Since the Smart Controller driver updates four parameters in a single operation, a single updated parameter could result in 3 parameters being updated with old information. See the Driver manual for further information.

Revision History

Date	Resp	Format	Driver Version	Doc. Rev.	Comment
11/4/03			1.00	0	For customer review
12/8/03			1.00	1	PMC: Notes on Server Side password challenge changed.
1/4/04			1.00	2	SSS: Updated with Server side password challenge ,English names for commands ,logged data items, special commands for multiread,.
2/2/04			1.01	0	SSS: Restructured error/alarm and data log to cope with variable length, added limitations.
2/24/04			1.01	1	Formatting changes.
11/9/04	Meg	Meg	1.01	2	Updated formatting to correct template (DUR0445). General re-write of document. Added connection diagram. (DUR0444)