External System Link Guide

Version 0. 1

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Revision History

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MDH	6-Jul-10	Initial document	0.1

Contents

1. Description

The Softcon program SCS_Client can link to external (host) systems via TCP or UDP or serial links, transferring and receiving data in "real time" as events occur.

2. Setup

1. Click setup, setup editor, External Links
   a. This is the setup for external links.
      i. Name: friendly name for the Link
      ii. PC: Which Client PC will be communicating with the external system.
      iii. Application: Which SCS (Softcon System) will communicate with the external system
      iv. Status: On-line or Off-Line indicating the current status of the link
      v. Talk: sets the communication protocol in use(Serial or TCP)
      vi. Delay: sets the delay in milliseconds that SCS waits for a response before resending the message
      vii. Log-file: where to log the external messages sent and received(Debugging purposes)
      viii. Repeat: number of attempts to send external message befor link is disconnected and set to off-line
      ix. Host: it talk is TCP then the IP address of the external system.
      x. Port: If talk is TCP then the port number of the external system
      xi. Speed: if talk is Serial, then the speed of the serial device.
      xii. Parity: if talk is Serial, then the parity of the Serial Device
      xiii. Data: if talk is Serial, then the bits of the port.
      xiv. Stopbits: if talk is Serial, then the stop bits of the port
      xv. Flow: if talk is Serial, then the flow control of the port

Ref	Name	PC	Application	Status	Talk	Delay	Log-file	Repeat	Host	Port	Speed	Parity	Data	Stopbits	Flo
0				Off-line											
1	Test	Localhost	SCS_Client	On-line	TCP	1000	C:\softwin3\EXT{DD-MM-YYYY}.txt	5	127.0.0.1	7000					
2															
3															
4															
5															
6															
7															
8															

Figure 1: External Links example

2. Click setup, External system link.
   a. These are the settings for what type of external system, and what is the external system controlling.
   b. Type:
      i. S.I: Sun international system(Casino)
      ii. Tsogo: Tsogo System(Casino)
      iii. WaveTrend: Wave trend system(Asset Tracking).
      iv. Softcon: All other external systems use the Softcon external link protocol.
   c. If the external system holds the databases select what data they store. For example vending, cards. If the external system holds the vend item and the items are not set up locally on the Softcon system the select External vend item.
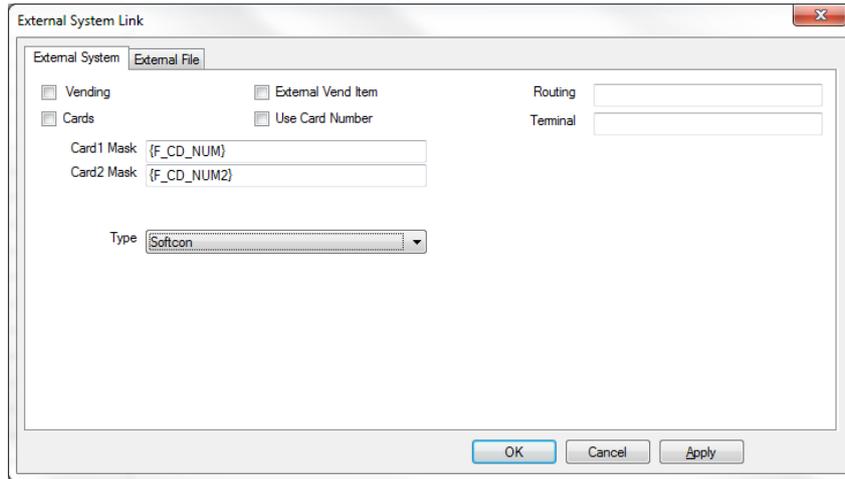
Figure 2: External System link

3. Click setup, setup editor, external link messages.
   a. Each links messages are setup here. For each link all the appropriate messages must be setup. Below is a table with each link's messages.

Messages	Link Type
T0000	Vend card request (funds request)
T0100	Vend Item request (price request)
T0200	Vend request (host control)
T0300	Vend done (local control)
T0400	Vend (host control)
T0500	Card entered
T0600	Card enter request
T0700	Input changed
T0800	Output changed
T0900	Change output
T1000	Cash loaded
T1100	POS request
T1200	Card data edit
T1300	Asset violation from external
T1400	Asset violation cleared
T1500	Card at reader
T1600	Card ext access req
T1601	Card ext access reply
T1700	Reader event
T1800	Controller event
T1900	Reader/Controller event
T2000	Read database
T2100	OK
T2200	Display data
T2300	Display photo

3. Developers Guide

1. General

The Softcon program SCS_Client can link to external (host) systems via TCP or UDP or serial links, transferring and receiving data in "real time" as events occur.

Currently two types of Softcon links are available (to be incorporated in to one later):

1. The type Softcon functions with multi-servers, SCS_Clients sends commands to and receives replies from hosts (host program does not initiate data transfer). Currently the asset functions described below do not function for type Softcon.
2. The type Asset runs as a separate client program and serves as a single server receiving and sending data with a host program (data transfer initiated by host or SoftWin3). Currently only data edit and asset tracking commands listed below function.

The **TCP/IP** address of the PC where the linked system SW is running is set and could be on the same PC. The **Port** used by the linked SW is set, identifying the link and must be greater than 700. Softcon programs use port addresses 2555 to 2570. If **Auto Start** is set, SCS_Client automatically connects to the linked system on start-up, start and stop selections can be made in the Set-up menu that established or terminates the link.

When a serial link is used, the COM port, baud rate and parity is set.

All correct messages require a reply and all messages end with a sequence number and a checksum. If the checksum is incorrect, the message is ignored with no reply and the Softcon system does a repeat after 1 second. After an unsuccessful repeat, the message is aborted. The sequence number is incremented for each new message per reader, with repeats using the same sequence number. If consecutive correct messages are received from a reader with the same sequence number, the message is ignored as a new message – a reply is still given (e.g. a vend done message could be correctly received, but the reply could be received incorrectly, this will result in the vended message being repeated with the same sequence number – but not seen as a new message, a reply is given).

2. DATA STRUCTURE

Messages consists of an ASCII string, characters such as '[' (5BHex), ']' (5DHex), '~' (7EHex) and '|' (7CHhex) are used as separators allowing variable length and to make data readable with testing. As '|' (7CHhex) is reserved as a separator it cannot be used as data – should it be required in a string, start and end the parameter with ".

<STX>COMMAND[PARAMETERS]ECHODATA~SEQ|SUM<ETX>

<STX>	02Hex
COMMAND	T+4 digit code (Softcon send – data transmitted from Softcon).
	R+4 digit code (Host send – data received by Softcon)
PARAMETERS	Parameters as required by the command
ECHODATA	Data echoed back as is with the reply
SEQ	One digit message sequence number 1 to 9 for the reader. New message uses the next number, a repeat uses the same.
SUM and SUM.	The least significant two digits of the sum all the data excluding STX, ETX
	See appendix for code example.
<ETX>	03Hex

Every command received (T message) must be replied to with the corresponding R message (e.g. T17xx, responded to with R17xx). If the command is unknown to the receiver, the reserved message Rxx99[xxyy] is replied, where xx is the fist 2 digits of the T message and yy the last 2 digits of the T message. The only exception is the disconnect message which will result in disconnect (reply is not

expected and is ignored). For backward compatibility, additional parameters added in future versions are added to the back of the parameters and should parameters be removed – null parameters are sent (i.e. ||).

Each connection keeps a sequence number for sent T and for R messages – and saves the last T and R messages received. The receiver of a message compares the sequence number with the previously received number. If the same, the data is ignored (else duplicates would occur – two entries or vends, etc.), but the reply must be repeated (with the same sequence number to the previous reply).

ECHODATA is optional (generally not used) and is simply use by the sender of a message to identify the reply with the request. On receiving a message with ECHODATA, i.e. data after the close square bracket], the reply R message adds the same data.

Date-time within the data is when the event occurred (e.g. the reader time-date, the vend OK time-date). Date-time from one message to another are not compared for the same message. Should data be required for identification of a response, the ECHODATA option can be used.

DISCONNECT
When the client program closes, it sends the disconnect message:
To TCP: T9999[]

3. COMMAND SUMMARY

COMMAND TO	COMMAND REPLY	EVENT
T0000[Rno|Cno]	R0000[Rno|Cno|Cname|Cval|Csub]	Vend card request (funds request)
	R0001[Rno|Cno]	Vend card not found
T0100[Rno|Ino]	R0100[Rno|Ino|Iname|Ival|Isub]	Vend Item request (price request)
	R0101[Rno|Ino]	Vend Item not found
T0200[Rno|Cno|Ino]	R0200[Rno|Cno|Cname|Cval|Csub|Ino|Iname|Ival|Isub]	Vend request (host control)
	R0201[Rno|Cno|Ino]	Vend request card not found
	R0202[Rno|Cno|Ino]	Vend request item not found
	R0203[Rno|Cno|Cname|Cval|Csub|Ino|Iname|Ival|Isub]	Vend request insufficient funds
T0300[Rno|Cno|Ino|Ival|Isub|YYYYMMDDhhmmss]	R0300[Rno|Cno|Cname|Cval|Csub|Ino]	Vend done (local control)
T0400[Rno|Cno|Ino|YYYYMMDDhhmmss]	R0400[Rno|Cno|Cname|Cval|Csub|Ino|Iname|Ival|Isub]	Vend done (host control)
T0500[Rno|Cno|YYYYMMDDhhmmss|PCno]	R0500[Rno|Cno|PCno]	Card entered
T0600[Rno|Cno|YYYYMMDDhhmmss]	R0600[Rno|Cno|Card holders name]	Card enter request
	R06xx[Rno|Cno|Error message]	Card enter request error
T0700[ino|Ino|YYYYMMDDhhmmss]	R0700[ino|Ino]	Input changed
T0800[ono|Ino|YYYYMMDDhhmmss]	R0800[ono|Ino]	Output changed
T0900[ono|Ino]	R0900[ono|Ino]	Change output
T1000[Rno|Cno|Ival|YYYYMMDDhhmmss]	R1000[Rno|Cno|Cname|Cval|Csub|Ival]	Cash loaded
T1100[PCno|Cno|YYYYMMDDhhmmss]	R1100[PCno|Cno|Card holders name]	POS request
	R1199[PCno|Cno|CardType|Points|Holders name|Message]	POS request error

	R11xx[PCno|Cno|Error message]	POS request error
T1200[PCno|Cref|YYYYMMDDhhmmss|f1|f2|fx]	R1200[PCno|Cref]	Card data edit
T1300[Vno|Aref|Lno|YYYYMMDDhhmmss| Vtype|Ano|Asset name|Cref]	R1300[Vno|Aref|Lno]	Asset violation from external
T1400[Vno|Aref|Lno|YYYYMMDDhhmmss]	R1400[Vno|Aref|Lno]	Asset violation cleared
T1500[Rno|Cref|Cno|CIssue|Cname|CamRef|?| YYYYMMDDhhmmss]	R1500[Rno|Cref|CamRef]	Card at reader
T1600[Rno|Cref|Cno|CIssue|Cname|CamRef| YYYYMMDDhhmmss|?|Message]	R1600[Rno|Cref|CamRef]	Card ext access req
T1601[Rno|Cref|CamRef|?]	R1601[Rno|Cref|CamRef]	Card ext access reply
T1700[ENo|EStat|EXef|EVal |YYYYMMDDhhmmss|Cno]	R1700[ENo|EStat]	Reader event
T1800[ENo|EStat|EXef|EVal |YYYYMMDDhhmmss]	R1800[ENo|EStat]	Controller event
T1900[Rno|Cno|Status|YYYYMMDDhhmmss]	R1900[Rno|Cno]	Reader/Controller event
	R1901[Rno|Cno|error description]	Error
T2000[Table ID|SQL]	R2000[Table ID|data|data|…]	Read database
	R2001[]	Error
T2100[Table ID|sql]	R2100[|	OK
	R2001[]	Error
T2200[PCno|Rno|Line 1|Line 2]	R2200[PCno|Rno]	Display data
T2300[PCno|Rno|path and file name.jpg]	R2300[PCnoRno]	Display photo
T333[Tx Nx Sx Xx Vx]	R3000	Generic Event
T9990]	No reply	SCS_S ocket
T9991[]	Reserved for type Tsogo	SCS_Client Socket
T9992[]	Reserved for type Tsogo	SCS_PPos Socket
T9993[PingValue|PingPeriod]	R9993[PingValue|PingPeriod]	SCS_Client ping oprtions
T9999[]	Disconnect. No reply	Disconnect

Abbreviations in this document:

Ano:	Asset number
Aref:	Asset reference number
CamRef:	Camera reference number
Cname:	Card holders name
Cno:	Card number or Softcon database reference number (set-up option)
Cref:	Softcon database reference number
Csub:	Card subsidy available in units (zero if not used)
Cval:	Card value available in units (e.g. 1250 for R12.50)
Echox:	Data that is simply echoed back in the reply
ENo:	Event Number field
EStat:	Event Status field
EVal:	Event Value field
EXref:	Event Xref field
Ino:	Item number
Iname:	Item name
Ival:	Item value in units
Isub:	Item subsidy in units (zero if not used)
Lno:	Location number
PCno:	PC number
Pref:	Primary key reference
QRef:	Reference to a query (in the query table)
Qsearch:	Search data used for the query

Rno:	Reader number
ino:	Input number
ono:	Output number
lno:	Level number (generally 1=closed, 2=open)
Vno:	Violation number
Vtype:	Violation type
iLevel:	Input Level
oLevel:	Output Level

4. DATA EDIT (Also type Asset)

When data in card data is edited, message is sent to external link if table EXT_DATA exists in database.mdb. This table has fields listing the field name, order and mask of data sent to the external link (f1, f2..fx parameters below). The mask sets the number of characters and character stuffing if required (character and position – back/front).

CARD DATA TO EXTERNAL

To TCP:	T1200[PCno|Cref|YYYYMMDDhhmmss|f1|f2|fx]
Typically:	T1200[PCno|Cref|YYYYMMDDhhmmss|employ number|surname|first name|dept number|card number|card status] Status: 0=disabled, 1=enabled, 2=capture
OK Reply:	R1200[PCno|Cref] Updates the host card database.
Error Reply:	R1201[PCno|Cref|Error]

5. DATA READ / WRITE

Data can be read from or written to a database with reference to the table via the table ID – see the table "TABLES" in c:\softwin3\config\database.mdb \table. On ID typically is DBT_CD for the card database.

For date-time fields, the syntax for MS Access is #yyyy/mm//dd hh:mm:ss# (starts and and with #) and for SQL server the syntax is 'yyyy/mm/dd hh:mm:ss' (starts and ends with single quote).

Forbidden characters in field and table names string are:

Dec	Hex	Char
27	1B	[
29	1D	]
40	28	(
41	29	)
44	2C	,
46	2E	.
96	60	'

READ DATABASE DATA

This message reads data from a database. The query reference selects setting in the SQL string. Optional additional data can be added that is simply echoed back. Only 1 record is read – e.g. where reference<3 will only read the 1st record as returned by SQL.

To TCP:	T2000[Table ID|SQL string]

OK Reply:	R2000[data|data|data]
Error Reply:	R2001[Table ID]

| Typically: | T2000[DBT_CD\|SELECT NAME,CD_ISSUE FROM CARD_DATA WHERE REFERENCE=1]~5\|10 |
| | R2000[zCard 001\|#2008/04/29 21:08:00#]~5\|86 |

WRITE DATABASE DATA

This message writes data to a database. The query is set in the SQL string. The first data field selects whether the RAM lookup table must be reloaded (data is 1) or not (data is 0) after the new data has been set. When inserting a new record, all the unique fields must be given.

ACCEPTABLE QUERY	REMARKS
INSERT INTO table_name (field1,field2,…,fieldN) VALUES (value1,value2,…,valueN)	This query requires primary key value.
UPDATE table_name SET field1=value1,field2=value2,…,fieldN=valueN WHERE condition	
DELETE FROM table_name WHERE condition	

To TCP:	T2100[reload RAM|Table ID|SQL string]

OK Reply:	R2100[Table ID]
Error Reply:	R2101[Table ID]

Typically:	T2100[1|DBT_CD|UPDATE CARD_DATA SET NAME='Mark',CD_ISSUE=#2007/01/25 15:16:17# WHERE REFERENCE=1]~7|34
	R2100[DBT_CD]~7|16
Typically:	T2100[1|DBT_CD|INSERT INTO CARD_DATA (REFERENCE,NAME,CD_ISSUE) VALUES (1000,'Card 1000',#2007/01/25 15:16:17#)]~8|79
	R2100[DBT_CD]~8|17

6. ACCESS CONTROL

Card entered: T0500[Rno|Cno|YYYYMMDDhhmmss|PCno]
  OK Reply: R0500[Rno|Cno|PCno]
  Error Reply: R0501[Rno|Cno|PCno]
  Event: **t**1 **n**Rno **s**22 **x**Cno (entered)
  Event: **t**1 **n**Rno **s**39 **x**Cno (duress)

Card enter request: T0600[Rno|Cno|YYYYMMDDhhmmss]
  OK Reply: R0600[Rno|Cno|Card holders name] Name is displayed at the reader and door opened
  Error Reply: R06xx[Rno|Cno|Error message] Error numbers xx are irrelevant.
    Error is displayed at readers and door not opened

Card POS request: T1100[PCno|Cno|YYYYMMDDhhmmss]

    OK Reply: R1100[PCno|Cno|Card holders name]   Name is displayed at PC and door opened

    OK Reply: R1199[PCno|Cno|CardType|Points|Card holders name|Message]

                                                  Name is displayed at PC and door opened. Loggs:

                                                  Z1 – Computer Number,
                                                  Z2-Z5 – Card Number,
                                                  Z6 – Passengers,
                                                  Z7 – Card Points,
                                                  Z8 – CardType

    Error Reply: R11xx[PCno|Cno|Error message]   Error numbers xx are irrelevant.

                                                  Error is displayed at PC and door not opened

Card at Reader: T1900[Rno|Cno|Status|YYYYMMDDhhmmss]

    OK Reply: R1900[Rno|Cno]

    ERROR Reply: R1901[Rno|Cno|Error description message]

    Status – the status of the transaction, 0 for verification failure (not allowed to enter) and 1 for verification success (allowed to enter). If the reader does not do verification, Status set to 1.

Reader event: Events that are logged are sent only if Reader events are enabled in external set-up (event **s** field is EStat, **v** field is EVAL, generally the cards trigger group).

                         T1700[ENo|EStat|EXref|EVal|YYYYMMDDhhmmss|Cno]

    OK Reply: R1700[ENo|EStat]

    Error Reply: R1701[ENo|EStat]

    Event: **t**1 **n**ENo **s**EStat **x**EXref **v**EVal

                        Where EStat (see card events in SCS_CLIENT.HLP for updated list):

18	Card Absent error.
20	Card Out-of-area.
21	Card Out-of-time.
22	Card Entered.
23	Card enabled.
24	Card disabled.
25	Card Expired.
26	Card Wrong PIN.
27	Card set-up.
29	Card APB error.
30	Card Out of count.
31	Card Late entered.
32	Card Captured.
33	Card No host.
34	Card Strictly from error.
35	Card Not found.
36	Set-up APB/strict.
37	Set-up out count.
38	Set-up expire.
39	Card Duress.
43	Parking exit.
44	Wrong card format.
45	Wrong card facility.

46	Card ATB error.
47	Park entry.
48	Park exit.
49	Card not captured.

7. DISPLAY

Display data: Display data on the Reader / PC. If line blank, does not override. The 1st 16 characters are displayed on the standard 16 character LCD. Delay in seconds (0 to 255) sets how long the data is displayed before the LCD reverts back to the normal display (e.g. the real time on the top line). 0 or null indicates normal LCD time-out and 255 indicates forever (i.e. till next display command). The message is displayed on the PC till the next event.

	T2200[PCNo	Rno	Line 1 data	Line 1 time-out	Line 2	Line 2 time-out]
OK Reply:	R2200[PCNo	Rno]
Error Reply:	R2201[PCNo	Rno	PCerror	Rerror]

Display Photo: Photo displayed on the PC

| | T2300[PCNo|Rno|path and file name to the JPG file] |
| OK Reply: | R2300[PCNo|Rno] |

8. INPUT / OUTPUT

Input/output messages could be sourced from Softcon with messages Txx, replies Rxx or sourced from the external system with messages Rxx, Softcon replies Txx.

Input Changed:	T0700[ino	lno	YYYYMMDDhhmmss]
OK Reply:	R0700[ino	lno]
Error Reply:	R0701[ino	lno]
Event:	**t**2 **n**ino **s**50 **v**lno

Output Changed:	T0800[ono	lno	YYYYMMDDhhmmss]
OK Reply:	R0800[ono	lno]
Error Reply:	R0801[ono	lno]
Event:	**t**3 **n**ono **s**50 **v**lno

Change Output:	T0900[ono	lno]
OK Reply:	R0900[ono	lno]
Error Reply:	R0901[ono	lno]
Event:	**t**3 **n**ono **s**53 **v**lno

9. GENERIC EVENT

The external system could pass an event to trigger a set of rules in the Softcon system.

Event: T3000[Tx Nx Sx Xx Vx]

Ok reply R3000

Events are messages that are generated by occurrences that happen in the system (e.g. inputs change, counters change, cards are enabled, cards are reported out-of-area, etc. Some events are automatically generated (e.g. if the event CARD OUT-OF-AREA is received from a controller, access checks if this is true. If the card in fact is not out of area, it automatically generates an event CARD ENABLED. Events can increment and decrement counters, can trigger new events and can start

programs. This is achieved by setting event triggers that are compared to events occurring, and when the trigger matches the event occurred, counts are in/decrements, new triggers generated and programs started.

An event is generated by posting a message on the notice board, and consists of 7 parts:

Type.   The event type defines what kind of event occurred:
1   Reader - data received from readers or data sent to readers.
2   Input - change in monitored inputs or the set-up.
3   Output - output being changed.
4   Controller - going on/off-line, powered up, set-up.
5   Camera.
6   Counter - counters changing value, or reaching minimum or maximum.
7   Timer.
8   Command-button (DDE event message generator). An event string is sent.
9   EXE-button. A program is started.
10   System.
11   Vend base.
12   Vend Item.
13   Asset receiver.
14   Vender.
15   Asset Tag.
16   GSM.
17   Mux.
18   PC.
101   Photo.
102   Database value, reader provides reference (string field gives ID to ACCESS.SQL file).
103   Drawing link.
500+   Database value (string gives ID to ACCESS.SQL file).
System: Defines which reader, input, output, counter or controller.
Status: What event occurred, e.g. out-of-area, level change, off-line, maximum reached, depending on type, e.g.
Readers: Out of area, Out of time, Entered, Card enabled, Card disabled.
Inputs: Level change.
Outputs: Level change.
Counter: Minimum reached, count changed, maximum reached.
Controllers: On, off-line, powered up.
The complete status list is (unless indicated as level, i.e. is in the state already, the status is edge, i.e. it occurred now):

Controller events:
1   On-line.
2   Off-line.
3   Power-up.
4   Set-up. t4 n? s4 x1 Sets RTC
5   Reset.
6   Request status.
7   Cards reset.
8   Cntrl time sync. t4 n? s8 xdate vtime is logged when starting SCS_Client with /cntrltime
9   Cntrl time sync error.   t4 n? s9 xdate vtime is always logged
10   SCS_Server off-line.   t10, xref = user, n=PC a1

Card / dB events (note 2):
17   Write (alter) database. t10 s17 n0 vsearch-ref xsearch-data z1data-ref z2data
Table DBT_ALT_DB in access.mdb references the search and data fields

e.g. _CD_REF 1,F_CD_STATUS 2,F_CD_COUNT 3.
e.g. to set the count of card 1 to 10: event: t10 s17 n0 v1 x10 z13 z210
Thus v tells where to search, x tells for what, z1 tells which data to change, z2 to what
18   Card Absent error.
19   Set card properties.   t10 n0 s19 xref vtrigger-grp z1area-group z2time-group z3status
(change is audited)
                    If v>0, set all cards with matching trigger group
20   Card Out-of-area.
21   Card Out-of-time.
22   Card Entered.
23   Card enabled.
24   Card disabled.
25   Card Expired.
26   Card Wrong PIN.
27   Card set-up.
28   Card at reader (level).
29   Card APB error.
30   Card Out of count.
31   Card Late entered.
32   Card Captured.
33   Card No host.
34   Card Strictly from error.
35   Card Not found (note 1).
36   Set-up APB/strict.
37   Set-up out count.
38   Set-up expire.
39   Card Duress.
40   Guest request (note 1).
41   Guest reply, value=error code where > 0 pay (note 1).
42   LCD display (V is the line number, data as parameter).
43   Parking exit.
44   Wrong card format.
45   Wrong card facility(note_1).
46   Card ATB error.
47   Park entry.
48   Park exit.
49   Card not captured.

I/O events:
50   Level changed.
51   In value (level).
52   Operation change (by time group).
53   Do change (to/from external).

Counter events:
70   Maximum (level and edge).
71   Minimum (level and edge).

72   Available (level and edge).
73   In maximum.
74   In Minimum.
75   In Available.

Timer events (See timers for details):
80   Timer set.
81   Timer start.
82   Timer stop.
83   Timer status.
85   Timer Started.
86   Timer Stopped.
87   Timer Timed-out.
88   Timer Cycling.

PC events:
99   Check PC.   t18 n? s99   when * with events, sets which PC does the task (e.g. FP add).

Operator events:
100   Operator changed.
101   Accept alarm.
102   Run report.   x is the report number.
103   Operator controller set-up.   t4 nCntrl s103 xref).
104   Operator controller reset.   t4 nCntrl s104 xref.
105   Backup. used as trigger to exe event.
106   Operator change DT.   t10 nPC s106 xoperator voldD z1_oldT.
107   Dist Server change DT.
108   Dist Server change DT error.
109   Visitor registered   t10 nPC s109 xCardRef vHostRef z1CurrentUser z2VisRef

General events:
130   Buzzer on.
131   Buzzer stop.
132   APB reset.
133   RAM refresh.
134   Net Ping.
135   Cards status check.
136   Cards expiry check.
137   Run exe event.
139   Set area count. x0 all cards, or specific; v0 default reset count value, else value.
140   Start RAM refresh.
141   Reset period count.   x and v as 139.
142   Reset period status.   x0 all cards, or specific; v0 status to alt, v1 status to normal.
143   Security shut down.
144   Server off-line. t10, alarm.
145   Server on-line. t10.
146   User terminates system.   t10, xref = user, n=PC, v=application.
147   User logged on. t10, xref = user.
148   User logged off (default logon).
149   Password change.
150   Illegal password change.

151	Unsuccessful password change.
152	Illegal logon attempt.
153	Encoding card. t10, xref=user, value=application,z1=card ref programmed.
154	Printing card. t10, xref=user, value=application,
	z1=card ref printed, z2=batch print count, z3=print reason, z4=material batch
155	LCD display.
156	Wrong Comms Interface version.
157	System Auto Log-off.

Camera control events (reserved for future use):

200	PTZ power.
201	Iris control.
202	Camera select.
203	Camera Monitor select.
220	PTZ zoom.
221	PTZ focus.
230	PTZ PAN.
240	PTZ tilt.
250	PTZ PAN/TILT.
251	PTZ PAN/TILT stop.
252	PTZ position set.
253	PTZ position go to.
260	PTZ alarm set.
261	PTZ alarm reset.

External system link events:

270	Ext Access Log.
271	Ext Access request.
272	Ext Access answer.
273	Ext Access Log.

Vending events (not logged):

300	Vend show funds.
301	Vend show item.
302	Vend Funds error.
303	Vend do.
304	Vend request.
305	Vend show value.
306	Vend show item.
307	Vend add cash.
308	Vend item not found.
309	Vend kM check.

Vending events (logged):

350	Vend PC add cash.
351	Vend cash added.
352	Vend filled.
353	Vend maintained.
354	Vend cleaned.
355	Vend vended.

356   Vended insufficient.
357   Vended Card unknown (**note 1**).
358   Vended Item unknown.
359   Vend filling due.
360   Vend maintenance due.
361   Vend Clean due.
362   Vend Clear done.
363   Vend PPOS sale (**note 1**).
364   Vend PPOS take-on.
365   Vend PPOS cash-up.
366   Vend PPOS Entry.
367   Vend PPOS Exit.
368   Vend PPOS Take-on.
369   Vend PPOS Cash-up.

Distribution server events:
400   DistrServer Start.
401   DistrServer Done.
402   DistrServer Failed.
403   DistrServer Modem Connected.
404   DistrServer Connection Failed.
405   DistrServer Connection Done.
406   DistrServer Start Listener
407   DistrServer Reveived Data.

SMS events:
450   SMS Sent.
451   SMS Remove on timeout (messages in send queue are removed after time-out, not sent due to error).
452   SMS Remove Stop (messages in send queue are removed after port is stopped).
453   SMS Error.
454   GSM: Incoming call.
455   GSM: Initialization.
456   GSM: Card not found.

Email events:
460   Email: Sent.   t10, n=computer ref, x=user ref, v=email_to ref
461   Email: No dial-up connection.
462   Email: No SMTP connection.
463   Email: Send error.
464   Email: User close App.
465   Email: Attachment error.

Modem events:
500   Scheduled link successfull.   Schedule reference in v.
501   Scheduled link error.   Schedule reference in v. Error in z1 (see SCS_CntrlModem logged messages).
502   Manual link successfull. Schedule reference in v.
503   Manual link error.   Schedule reference in v1. Error in z1 as above.
504   Modem/Cntrl overrun.

Fingerprint events:
510   FP Add Record (see **FP events** for details). If more than 1 PC, the algorithm requires * with a trigger t18 n? s99.
511   FP Add Record Done.
512   FP Remove Record.
513   FP Remove Record Done.
514   FP Download dB.
515   FP Download dB Done.
516   FP Clean dB.
517   FP Clean dB Done.
518   FP Enrol System.
519   FP Enrol System Done.
520   FP Enrol User.
521   FP Error.
522   FP Reader Setup.
523   FP Reader Setup Done.
524   FP Logs.
525   FP Logs done.

Video capture events:
530   Video capture do (see **video events** for details).
531   Video capture done.
532   Video capture error.

Asset events:
600   Asset Violation.
601   Asset Violation Cleared.
610   Asset Issued.
611   Asset Returned.
612   Asset Booked.
613   Asset Booking removed.
614   Asset Booking expired.
615   Asset Late Return.

Controller events:
1020   Out-of-area.
1021   Out-of-time.
1022   Entered.
1025   Expired.
1026   Reversed.
1027   Card set-up.
1050   Level change.

k**Value.** Some event types use this value to indicate more information, e.g. input change. It indicates the level of the input change (1 or 2). See **Input setup** in counting and event triggers, if value is zero, it is ignored for the event match. In reader event types it can be set with the card trigger group that must match the event (if zero, the cards trigger group is ignored). For outputs, 1 to 10 is the output level, 11 to 20 is permanent level not changed by time group in the controller (all controllers may not have this feature). In the Softcon MD350 mimic driver controller, Level 1 is on, level 2 is off and level 3 on the output sets the LED to flashing.

k**Xref.** Some event types use this to give additional information. When used with readers, it indicates a specific card (if zero, all cards).

k**Alarm.** When the PC receives an event, it is checked whether it is in alarm. Certain events are always alarm (e.g. off-line) and others on only on set time (e.g. inputs). When alarm is detected, the event alarm field is set to 2 and when normal it is set to 1. None is set to 0 and alarm accepted is set to 3.

k**Zx.** Certain events use additional z1 to z7 parameters that contain additional data. The vending and long card number data are stored in these parameters.

When the Softcon program ACCESS.EXE starts running, it generates the event:
t4 n0 s3 x0 v0   Controller 0, powered up.
This can be used to reset APB, count the number of times it started, etc.

When access receives the event t4 n0 s3 x0 v0, it automatically generates the event:
    t4 nx s6 x0 v0   Controller x, request status for each controller.

#Note 1: parameters Z2 to Z5 contain card data, with Z2 the decimal number of the first 6 (hexadecimal) digits, Z3 the digits 7 to 12, Z4 the digits 12 to 18 and Z5 the last 2 digits. A -1 value in Z2 to Z5 indicates no digits. In the activity display, the Z2 parameter is displayed as the hex string calculated from Z2 to Z5.

#Note 2: Card **access control events** of cards in the card database (20 … 34, 39) generated by the system set the v field with the cards trigger group. The trigger group can be used for special triggers in generating new events, incrementing counters, sending SMS, etc.

10.   CONTROLLER

Controller events that are logged are sent if enabled in the external set-up. Messages are sourced from Softcon when the event occurs with messages Txx, external replies Rxx.

Controller Event:	T1800[ENo|EStat|EXrefl|EVal|YYYYMMDDhhmmss]
OK Reply:	R1800[ENo|EStat]
Error Reply:	R1801[ENo|EStat]
Event:	**t**4 **n**ENo **s**EStat **x**EXref **v**EVal

Where EStat (see card events in SCS_CLIENT.HLP for updated list):
1   On-line.
2   Off-line.
3   Power-up.

11.   ASSET TRACKING (Only type Asset)

Asset Violation (To SCS_Atracksvr.exe from external asset system)

|	
From TCP:	T1300[Vno|Aref|Lno|YYYYMMDDhhmmss|Vtype|Ano|Asset name|Cref]
OK Reply (to TCP):	R1300[Vno|Aref|Lno]
Event:	t15 nAref s600 xCref vLno z1Vno z2Vtype a2
Error Reply (to):	R1301[Vno|Aref|Lno|Error]

Asset cleared (From SCS_Atracksvr.exe to Softwin3)

To TCP:	T1400[Vno|Aref|Lno|YYYYMMDDhhmmss|Vtype|Cref]
OK Reply:	R1400[Vno|Aref|Lno]

Event:	t15 nAref s601 xCref vLno z1Vno z2Vtype
Error Reply:	R1401[Vno|Aref|Lno|Error]

Asset cleared by Host (From SCS_Atracksvr.exe to external asset system)

From TCP:	T1400[Vno|Aref|Lno|YYYYMMDDhhmmss|Vtype|Cref]
OK Reply:	R1400[Vno|Aref|Lno]
Error Reply:	R1401[Vno|Aref|Lno|Error]
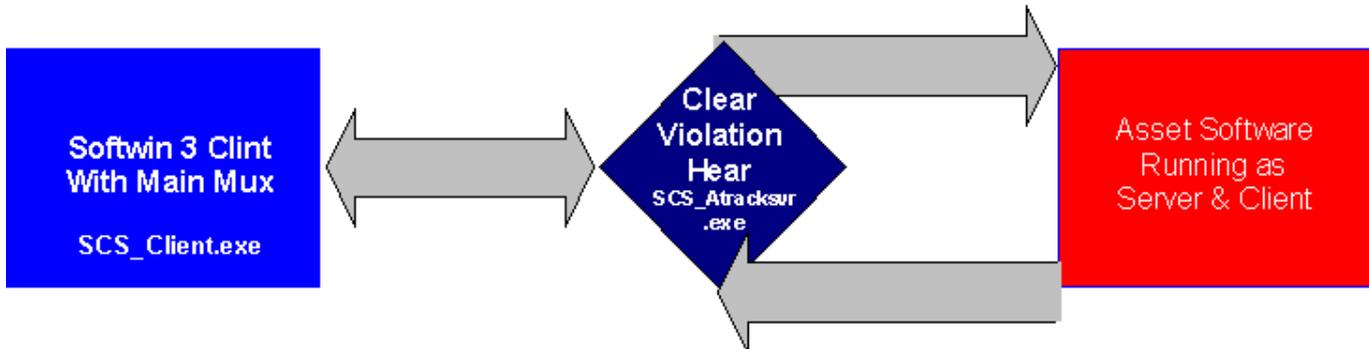
12.   VENDING

When linking to external systems for vending, the card data is always external. Item data can optionally be external. The Softcon system contains its own item database in all cases. This database is updated from the external system when communication takes place as a result of events at the vending machine. Event logging is done as when no external links are set. Data that is updated in the Softcon databases are indicated in bold, underline.

All vending functions are initiated by the vending controller – the controller sends requests and the PC replies with an appropriate response. The vending sequence is:

1. A card is presented at reader. The controller sends a **name and funds request**.
2. PC replies with name and funds, or not found message – data displayed at the vender for 10 seconds.
3. If a selection is made while the name is displayed, a **vend request** is sent to the PC.
4. PC replies with a do vend message or with an error message (not found, insufficient funds).
5. On successful completion of the vend (tea could take longer than 10 seconds), the controller sends a **vend done** message. If unsuccessful (e.g. no cups), no message is sent.
6. The PC replies with the name and the new funds (step 2 above).

Step 3 (selection) does not have to follow step 2 (display of name). Step 3 could be followed with a new step 1 (name request).

If a selection is made (step 7) while the name is not displayed (no card was presented or the display timed out), an **item price request** is sent to the PC. The PC replies with the item name and price. This is displayed for up to 10 seconds. Step 7 could be followed by a step 1 (name and funds request), by another step 7 (item request) or by no action.

While waiting for a response from the PC, the controller displays a "waiting for communication" message – this times out after 10 seconds and the transaction is cleared.

CARD DATA EXTERNAL (minimum link to external system)

Card Vend data request (funds request):

Vender message:	**1**
	Clears the card value and subsidy in the Softcon database.
To TCP:	T0000[Rno|Cno]
OK Reply:	R0000[Rno|Cno|Cname|Cval|Csub]
	Updates the Softcon card database.
Event:	**t**1 **n**Rno **s**300 **x**Cno
	Top line display: Card name
	Bottom line displays value and subsidy ("v000-00 s000-00")
Error Reply:	R0001[Rno|Cno] CARD NOT FOUND
Event:	**t**1 **n**Rno **s**300 **x**0
	Top line display: "Card unknown "

ITEM DATA NOT EXTERNAL

Vend done:

Vender message:	**41**
To TCP	T0300[Rno|Cno|Ino|Ival|Isub|YYYYMMDDhhmmss]
OK Reply:	R0300[Rno|Cno|Cname|Cval|Csub|Ino]
	Updates the Softcon card database.
Event:	**t**12 **n**Rno **s**355 **x**Cno **z1**(Ival+Isub) **z2**Isub **z3**0 **z4**Ival **z5**1

Cash loaded:

Vender message:	**10**	
To TCP value	T1000[Rno|Cno|Ival|YYYYMMDDhhmmss]	Ival is the note
OK Reply: new value	R1000[Rno|Cno|Cname|Cval|Csub|Ival]	Cval is the cards
	Updates the Softcon card database.	
Event:	**t**1 **n**Rno **s**351 **x**Cno **z1**Ival **z2**Cval	

ITEM DATA EXTERNAL (optional link to external system)

Vend Item Data request (item price request):

Vender message:	**40 (card 0)**
Event if item not found in Softcon database:	
	t1 **n**Rno **s**301 **x**0 **z1**Ikey **z2**Ikval **z3**0
	Top line display: "Item unknown "
To TCP item found:	T0100[Rno|Ino]
OK Reply:	R0100[Rno|Ino|Iname|Ival|Isub]
	Updates Softcon item database.
Event:	**t**1 **n**Rno **s**301 **x**0 **z1**Ikey **z2**Ikval **z3**Ino
	Top line display: Item name

Bottom line displays item value and subsidy ("c000-00 s000-00")

Error Reply: FOUND	R0101[Rno|Ino]	ITEM NOT
Event:	**t**1 **n**Rno **s**301 **x**0 **z1**Ikey **z2**Ikval **z3**0	
	Top line display: "Item unknown "	

Vend request (host system grants or denies request):

Vender message:	**40 (card not 0)**
Event if item not found:	
	t1 **n**Rno **s**301 **x**0 **z1**Ikey **z2**Ikval **z3**0
	Top line display: Item name (R0100) or "Item unknown "
To TCP item found:	T0200[Rno|Cno|Ino]

OK Reply:	R0200[Rno|Cno|Cname|Cval|Csub|Ino|Iname|Ival|Isub]	DO VEND
	Updates the Softcon item database.	
Event:	**t**1 **n**Rno **s**303 **x**Cno **z1**Ikey **z2**Ikval **z3**Ino **z4**Ival **z5**Cval **z6**Csub	

Error Reply: FOUND	R0201[Rno|Cno|Ino]	CARD NOT
Event:	**t**1 **n**Rno **s**300 **x**0	
	Top line display: "Card unknown "	

Error Reply: FOUND	R0202[Rno|Cno|Ino]	ITEM NOT
	t1 **n**Rno **s**301 **x**Cno **z1**Ikey **z2**Ikval **z3**0	
	Top line display: "Item unknown "	

Failed Reply:	R0203[Rno|Cno|Cname|Cval|Csub|Ino|Iname|Ival|Isub]
	INSUFFIECIENT FUNDS
	Updates the Softcon item and card database.
Event:	**t**1 **n**Rno **s**302 **x**Cno **z1**Ikey **z2**Ikval **z3**Ino
	Top line display: "Check funds "

Vend done:

Vender message:	**41**
To TCP	T0400[Rno|Cno|Ino|YYYYMMDDhhmmss]
OK Reply:	R0400[Rno|Cno|Cname|Cval|Csub|Ino|Iname|Ival|Isub]
	Updates the Softcon item and card database.
Event:	**t**12 **n**Ino **s**355 **x**Cno **z1**(Ival+Isub) **z2**Isub **z3**0 **z4**Ival **z5**1

Cash loaded:

Vender message:	**10**	
To TCP value	T1000[Rno|Cno|Ival|YYYYMMDDhhmmss]	Ival is the note
OK Reply: cards new value	R1000[Rno|Cno|Cname|Cval|Csub|Ival]	Cval is the
	Updates the Softcon card database.	
Event:	**t**1 **n**Rno **s**351 **x**Cno **z1**Ival **z2**Cval	

13.   CCTV

Card access by Softcon – If a reader has a camera selected (not zero) and the card or reader does not have external access set, then card entered, card out of area, card out of time, card duress messages from controllers generate event s270.

Event:	**t**1 **n**Rno **s**270 **x**Cref **v**CamRef	Not logged
To TCP	T1500[Rno|Cref|Cno|CIssue|Cname|CamRef|?|YYYYMMDDhhmmss]	

?: 0=No access, 1=Access, 2=Capture.

OK Reply: R1500[Rno|Cref|CamRef]

Card request by Softcon – If a reader has external access set and the card has external access set, the card data is not kept in the controller. Card out of area from controllers generate event s271.

Event:	**t**1 **n**Rno **s**271 **x**Cref **v**CamRef	Event, log, display
To		TCP

T1600[Rno|Cref|Cno|CIssue|Cname|CamRef|YYYYMMDDhhmmss|?|Message]

?: 1=No Access, 2=Access

Message: Enabled, Disabled, Expired, Out-of-Area, Host error…

OK Reply: R1600[Rno|Cref|CamRef]   Results in next

Card request by Softcon – reply to previous

From TCP: T1601[Rno|Cref|CamRef|?|YYYYMMDDhhmmss]

?: 0=No access, 1=Access, 2=Capture.

OK Reply: R1601[Rno|Cref|CamRef]

Event: **t**1 **n**Rno **s**272 **x**Cref **v**? **z**1CamRef   Event, log, display

Note that if the external system does not need CamRef, it simply ignores it. Must be echoed back in the reply.

14.   Ping

Ping options by External system link – External system requests ping options (only TCP/IP):

From TCP   T9993[PingActivate|PingPeriod]

OK Reply: R9993[PingActivate|PingPeriod]

PingActive: 0 – deactivates Softcon ping, **not zero –** activates Softcon ping. External link with type Wavetrend – ping always activated.

PingPeriod: format is mmss (minutes, seconds).

Note that Softcon default ping options: Ping is activated, ping period is 0030 (30 seconds).

15.   APPENDIX (CHECKSUM CODE SAMPLE)

CString strMsg("T1000[BBBBBB|kkkkkk|0123456|20050131123632]~1|");

```
long nSum = 0;
int nLen = strMsg.GetLength();

for (int i = 0; i < nLen; i++)
{
  BYTE bh = (BYTE)strMsg.GetAt(i);
  nSum += bh;
}

strTemp.Format(_T("%02d"), nSum % 100);

strMsg += strTemp;
```

For example, if sum == 1234 the checksum will be 34, last two digits in string format.