



# External System Link Guide

**Revision 00.06**

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# Revision History

Version	Date	Person	Reason For Changes
00.00	2009-2-20	MTL	Initial document
00.01	2010-7-6	MDH	Complete update
00.02	2013-10-21	MTL	Update to new standard document format Add display fields to vending commands
00.03	2013-10-30	MTL	Add machine and product names and cell to T2400
00.04	2016-07-20	MTL	Add tokens to R0200, R0203, R0300, R0400, R1000
00.05	2016-07-22	YV	Revision to R0000, R0200, R0203, R0300, R0400, R1000 and T2100
00.06	2016-07-22	YV	Note that TT2200 and TT2300 to be implemented on request

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- ⇒ In this document, lines marked with this bullet are proposed changes that may be implemented in future.
- ✓ In this document, lines marked with this bullet are changes that are currently being implemented.

# 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

## 2.1. Click setup, setup editor, External Links

This is the setup for external links.

- Name: Friendly name for the Link
- PC: Which Client PC will be communicating with the external system.
- Application: Which SCS (Softcon System) will communicate with the external system
- Status: On-line or Off-Line indicating the current status of the link
- Talk: Sets the communication protocol in use(Serial or TCP)
- Delay: Sets msec delay in that SCS waits for a response before resending the message
- Log-file: Where to log the external messages sent and received(Debugging purposes)
- Repeat: Nr attempts to send external message before link disconnected and set off-line
- Host: If talk is TCP then the IP address of the external system.
- Port: If talk is TCP then the port number of the external system
- Speed: If talk is Serial, then the speed of the serial device.
- Parity: If talk is Serial, then the parity of the Serial Device
- Data: If talk is Serial, then the bits of the port.
- Stopbits: If talk is Serial, then the stop bits of the port
- 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	Flow
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

## 2.2. Click setup, External system link

These are the settings for what type of external system, and what is the external system controlling.

- Type: S.I: Sun international system(Casino)
- Tsogo: Tsogo System(Casino)
- WaveTrend: Wave trend system(Asset Tracking).
- Softcon: All other external systems use the Softcon external link protocol.

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.

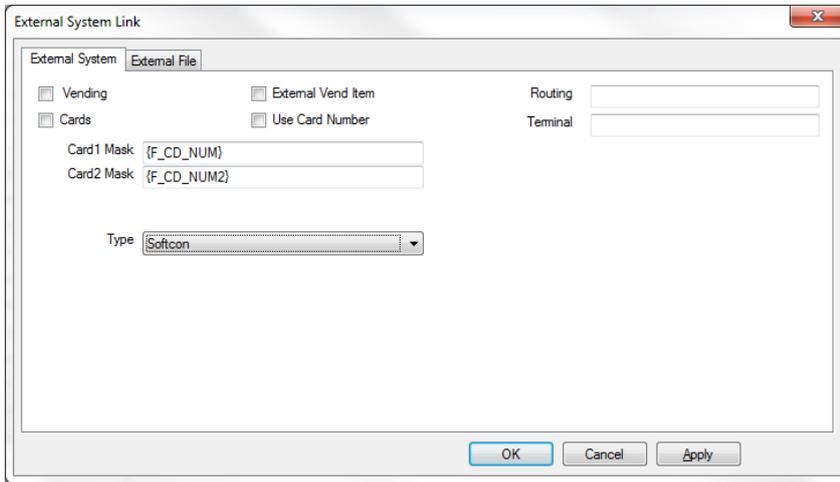


Figure 2: External System link

2.3. Click setup, setup editor, external link messages

Each link's 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 (to be implemented on request)
T2300	Display photo (to be implemented on request)

## 3 DEVELOPERS GUIDE

### 3.1. 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):

3.1.1. 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.

3.1.2. 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).

### 3.2. 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	The least significant two digits of the sum all the data excluding STX, ETX and SUM. 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[xyy] is

replied, where xx is the first 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[]

### 3.3. COMMAND SUMMARY

COMMAND TO	COMMAND REPLY	EVENT
T0000[Rno Cno]	R0000[Rno Cno Cname Cval Csub #Line2 #Ctoken]	Vend card request (funds request)
	R0001[Rno Cno #Line1 #Line2]	Card not found
T0100[Rno Ino]	R0100[Rno Ino Iname Ival Isub #Line2]	Vend Item request - host
	R0101[Rno Ino #Line1 #Line2]	Item not found
T0200[Rno Cno Ino]	R0200[Rno Cno Cname Cval Csub Ino Iname Ival Isub #Ctoken]	Vend request - host
	R0201[Rno Cno Ino #Line1 #Line2]	Card not found
	R0202[Rno Cno Ino #Line1 #Line2]	Item not found
	R0203[Rno Cno Cname Cval Csub Ino Iname Ival Isub #Line2 #Ctoken]	Insufficient funds
T0300[Rno Cno Ino Ival Isub YYYYMMDDhhmmss]	R0300[Rno Cno Cname Cval Csub Ino #Ctoken]#echoData	Vend done - local
T0400[Rno Cno Ino YYYYMMDDhhmmss]	R0400[Rno Cno Cname Cval Csub Ino Iname Ival Isub #Ctoken]	Vend done - host
T0401[Rno Cno Ino YYYYMMDDhhmmss]	R0401[Rno Cno Ino]	Vend not done - host
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 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 #Ctoken]	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[PCno Rno]	Display photo
T2400[Rno Bno YYYYMMDDhhmmss vna Bna Ccel]	R2400[Rno Bno]	Vend base low
T2500[vno Cno YYYYMMDDhhmmss]	R2500[Rno Cno]	Vend filled
T3000[Tx Nx Sx Xx Vx]	R3000	Generic Event
T9990]	No reply	SCS_Socket
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 options
T9999[]	Disconnect. No reply	Disconnect

## Abbreviations in this document:

Ano:	Asset number
Aref:	Asset reference number
Bno:	Vend base number
Bna:	Vend base name
CamRef:	Camera reference number
Cname:	Card holders name
Cno:	Card number or Softcon database reference number (set-up option)
Ccel	Card 1 cell number
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:	Vender number
vna:	Vender name
Vno:	Violation number
Vtype:	Violation type
iLevel:	Input Level
oLevel:	Output Level

### 3.4. 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]

### 3.5. 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 ends 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 1<sup>st</sup> 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]

### Parameters:

reload RAM Reload RAM in client applications when it is not 0 and SQL Query changes more than 10 records.

Table ID Softcon system table ID, example DBT\_CD.

SQL Query SQL query for insert, update and delete records.

Card set-up Sends card to all controllers when it is not 0 and Table ID is DBT\_CD.

**Example 1:** 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

**Example 2:** 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

**Special case 1:** T2100[reload RAM|DBT\_MG|UPDATE\_CARD\_MG cd\_ref|Card set-up]  
reload RAM This parameter is ignored by Softcon system.  
DBT\_MG This parameter is fixed and must be DBT\_MG.  
UPDATE\_CARD\_MG This parameter is fixed and must not be changed.  
cd\_ref Reference field in CARD\_DATA table.  
Card set-up Sends card to all controllers when it is not 0.

**Special case 2:** T2100[reload RAM|DBT\_CD|UPDATE\_CARD\_CD cd\_ref|Card set-up]  
reload RAM This parameter is ignored by Softcon system.  
DBT\_CD This parameter is fixed and must be DBT\_CD.  
UPDATE\_CARD\_CD This parameter is fixed and must not be changed.  
cd\_ref Reference field in CARD\_DATA table.  
Card set-up Sends card to all controllers when it is not 0.

### 3.6. ACCESS CONTROL

**Card entered:** T0500[Rno|Cno|YYYYMMDDhhmmss|PCno]

OK Reply: R0500[Rno|Cno|PCno]

Error Reply: R0501[Rno|Cno|PCno]

Event: **t1 n**Rno **s22 x**Cno (entered)

Event: **t1 n**Rno **s39 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: **t1 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.

### 3.7. DISPLAY (to be implemented on request)

**Display data:** Display data on the Reader / PC. If line blank, does not override. The 1<sup>st</sup> 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]

### 3.8. 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: t2 nino s50 vln0

**Output Changed:** T0800[ono|lno|YYYYMMDDhhmmss]  
 OK Reply: R0800[ono|lno]  
 Error Reply: R0801[ono|lno]  
 Event: t3 nono s50 vln0

**Change Output:** T0900[ono|lno]  
 OK Reply: R0900[ono|lno]  
 Error Reply: R0901[ono|lno]  
 Event: t3 nono s53 vln0

### 3.9. 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:

<b>Type.</b>	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 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 Received 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.

**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.

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

**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.

**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.

### 3.10. 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|EXref|EVal|YYYYMMDDhhmmss]

OK Reply: R1800[ENo|EStat]

Error Reply: R1801[ENo|EStat]

Event: t4 nENo sEStat xEXref vEVal

Where EStat (see card events in SCS\_CLIENT.HLP for updated list):

- 1 On-line.
- 2 Off-line.
- 3 Power-up.

### 3.11. 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

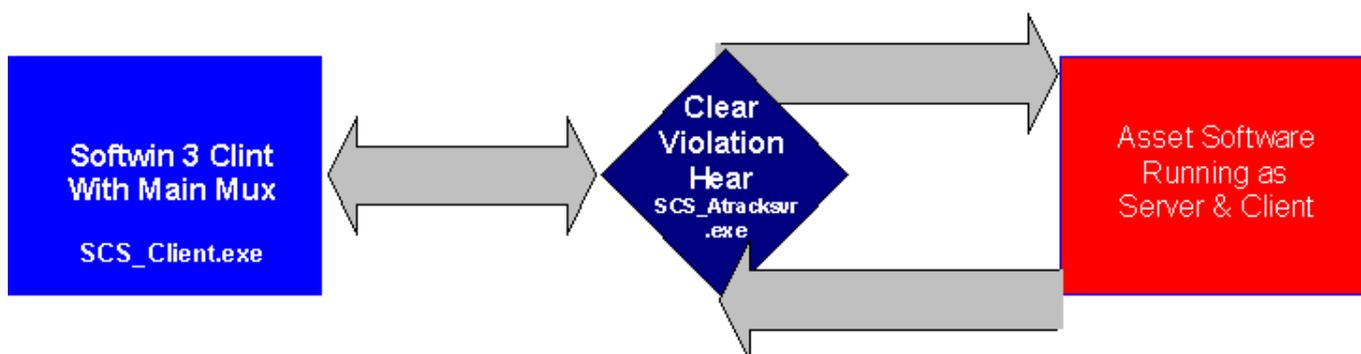
Error Reply: R1401[Vno|Aref|Lno|Error]

**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]



## 3.12. 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 in the message definitions below. When the appropriate field received from the external system is blank, i.e. ||, the data in the Softcon system is left unchanged.

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. If so set in the controller, the controller will automatically send a card request to the PC, the PC replies with the name and the new funds (same as 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 so set in the controller (set to no coin – i.e. only one 1 payment cashless system) and 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.

In the message below, Csub (card subsidy available) is replaced with Ctok (card tokens available) when the Softcon system is set to use tokens. Fields in starting with # are optional.



### Vend product low:

Generated by SCS\_Client

To TCP: T2400[Rno|Bno|YYYYMMDDhhmmss|vna|Bna|Ccel] BASE LOW

OK Reply: R2400[Rno|Bno]



### Vend filled:

Vender message: **13**

Event: t14 nvno s352 xref v0 VENDER FILLED

To TCP T2500[Rno|Cno|YYYYMMDDhhmmss]

OK Reply: R2500[Rno|Cno]

## 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**|#Line2|#Ctoken]

Updates the Softcon card with **Cname**, **Cval** and **Csub**. The general set-up must be set to update these values.

Card tokens:

- Softcon system is set to use token. The system does not update card subsidy. If **Ctoken** is present the system updates card token with **Ctoken**, else the system updates card token with **Csub**
- Softcon system is not set to use token: the system updates card token with zero

Event: t1 nRno s300 xCno

Top line display: Card name

Bottom line displays:

Value, subsidy/token ("v000-00 s000-00") if no #Line2 in string (6 parameters).

Displays data received in Line2 (PC sets Char 20 set to 0x0).

✓

Error Reply: R0001[Rno|Cno|#Line1|#Line2]

CARD NOT FOUND

Event: t1 nRno s300 x0

Top line display:

"Card unknown " if no #Line1 in string (3 parameters)

Displays data received in Line1

Bottom line display:

Blank if 3 parameters

Displays data received in Line2 (PC sets Char 20 set to 0x1)

## 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|#Ctoken]#echoData

Updates the Softcon card with **Cname**, **Cval** and **Csub**. The general set-up must be set to update these values.

Card tokens:

- Softcon system is set to use token. The system does not update card subsidy. If **Ctoken** is present the system updates card token with **Ctoken**, else the system updates card token with zero
- Softcon system is not set to use token: the system updates card token with zero

Event: If Softcon system is set to use token and external vending:

- Softcon vend item is set to use PC

t12 nIno s355 xCno z1ItemCharge z20 z4ItemCharge z51 z7CardToken

- Softcon vend item is set to do not use PC

t12 nIno s355 xCno z1#echoData z20 z4#echoData z51 z7CardToken

Else:

t12 nIno s355 xCno z1(Ival+Isub) z2Isub z30 z4Ival

## Cash loaded:

Vender message: **10**

To TCP T1000[Rno|Cno|lval|YYYYMMDDhhmmss] lval is the note value

OK Reply: R1000[Rno|Cno|**Cname**|**Cval**|**Csub**|lval|**#Ctoken**] Cval is the cards new value  
Updates the Softcon card with **Cname**, **Cval**, **Csub** and **CToken** (if present). The general set-up must be set to update these values.

Event: **t1 n**Rno **s351 x**Cno **z1**lval **z2**Cval

## ITEM DATA EXTERNAL (optional link to external system)

### Vend Item Data request (item price request – if 1 payment cashless system):

Vender message: **40 (card 0)**

Event if item not found in Softcon database:

**t1 n**Rno **s301 x0 z1**lkey **z2**lkval **z30**

Top line display: "Item unknown "

To TCP item found: T0100[Rno|lno]

⇒

OK Reply: R0100[Rno|lno|**lname**|**lval**|**lsub**|#Line2]

Updates Softcon item database.

Event: **t1 n**Rno **s301 x0 z1**lkey **z2**lkval **z3**lno

Top line display: Item name

Bottom line displays:

Item value, subsidy ("c000-00 s000-00") if no Line2 in string

Displays data received in Line2.

⇒

Error Reply: R0101[Rno|lno|#Line1|#Line2]

ITEM NOT FOUND

Event: **t1 n**Rno **s301 x0 z1**lkey **z2**lkval **z30**

Top line display:

"Item unknown " if no Line1 in string

Displays data received in Line 1

Bottom line display:

Blank if no Line2 in string

Displays data received in Line 2

### Vend request (host system grants or denies request):

Vender message: **40 (card not 0)**

Event if item not found:

**t1 n**Rno **s301 x0 z1**lkey **z2**lkval **z30**

Top line display:

Item name (R0100) or "Item unknown "

To TCP item found: T0200[Rno|Cno|lno]

OK Reply: R0200[Rno|Cno|Cname|**Cval**|**Csub**|lno|**lname**|**lval**|**lsub**|**#Ctoken**] DO VEND

Updates the Softcon vend item with **lname**, **lval**, **lsub** and the Softcon card with **Cname**, **Cval**, **Csub**. The general set-up must be set to update these values.

Card tokens:

- Softcon system is set to use token. The system does not update card subsidy. If **CToken** is present the system updates card token with **CToken**, else the system updates card token with zero

- Softcon system is not set to use token: the system updates card token with zero

Event: **t1 n**Rno **s303 x**Cno **z1**lkey **z2**lkval **z3**lno **z4**lval **z5**Cval **z6**Csub **z7**CToken

⇒ Error Reply: R0201[Rno|Cno|Ino|#Line1|#Line2] CARD NOT FOUND  
 Event: t1 nRno s300 x0  
 Top line display:  
     "Card unknown " if no #Line1 in string (3 parameters)  
     Displays data received in Line1  
 Bottom line display:  
     Blank if 3 parameters  
     Displays data received in Line2

⇒ Error Reply: R0202[Rno|Cno|Ino|#Line1|Line2] ITEM NOT FOUND  
 t1 nRno s301 xCno z1lkey z2lkval z30  
 Top line display:  
     "Item unknown " if no #Line1 in string (3 parameters)  
     Displays data received in Line1  
 Bottom line display:  
     Blank if 3 parameters  
     Displays data received in Line2

⇒ Failed Reply:R0203[Rno|Cno|Cname|Cval|Csub|Ino|Iname|Ival|Isub#Line2|#Ctoken] INSUFFICIENT FUNDS  
 Updates the Softcon vend item with **Iname, Ival, Isub** and the Softcon card with **Cname, Cval, Csub**. The general set-up must be set to update these values.  
 Card tokens:  
 - Softcon system is set to use token. The system does not update card subsidy. If **Ctoken** is present the system updates card token with **Ctoken**, else the system updates card token with zero  
 - Softcon system is not set to use token: the system updates card token with zero  
 Event: t1 nRno s302 xCno z1lkey z2lkval z3Ino  
 Top line display: Card name  
 Bottom line display:  
     "Check funds " if no Line2 in string  
     Displays data received in Line2

**Vend done:**

Vender message: 41  
 To TCP T0400[Rno|Cno|Ino|YYYYMMDDhhmmss]  
 OK Reply: R0400[Rno|Cno|Cname|Cval|Csub|Ino|Iname|Ival|Isub|#Ctoken]  
 Updates the Softcon card with **Cname, Cval, Csub**. The general set-up must be set to update these values.  
 Card tokens:  
 - Softcon system is set to use token. The system does not update card subsidy. If **Ctoken** is present the system updates card token with **Ctoken**, else the system updates card token with zero  
 - Softcon system is not set to use token: the system updates card token with zero  
 Event: t12 nIno s355 xCno z1(Ival+Isub) z2Isub z4Ival z51

**Vend not done:**

Vender message: 45  
 To TCP T0401[Rno|Cno|Ino|YYYYMMDDhhmmss]  
 OK Reply: R0401[Rno|Cno|Ino]  
 Event: t12 nIno s368 xCno

### 3.13. 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:      t1 nRno s270 xCref vCamRef          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:      t1 nRno s271 xCref vCamRef          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:      t1 nRno s272 xCref v? z1CamRef      Event, log, display
```

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

### 3.14. 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).

### 3.15. 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.