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CECB4 5580 API Specification

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5580 API Protocol Specification

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Functional Overview

Our customers require in this day and age the ability to interface their hardware/software programs of their products to our products. Our CECB4 is exactly that type of product. The CECB4 "Cash Escrow Controller Board Version #4" is the most powerful vending controller on the market today! The CECB4 will interface to virtually any other computer driven product. Examples are; Print Vending Software Programs, Library Patron Check Out Software, Copier, Printer and other computer driven office machines. Virtually any microprocessor driven machine can be interfaced to our CECB4 Vending Controller Board.

Introduction

This document provides detailed information on the API commands used to interface the CECB4 5580 vending controller board and a host (PC). The communications interface from the 5580 is a master/slave where the host is the master and the 5580 is the slave. Note on nomenclature - in all following descriptions, hexadecimal values are indicated by a trailing 'h' character after a number, while decimal values are indicated by a trailing 'd'. Numbers encased in brackets are assumed to be hexadecimal if there is no trailing character. (E.g. <80> means 80h, or 128d).

API Protocol Format sequence uses a common protocol consisting of a command packet and a response packet. The packet structure ensures a method of error detection and recovery. A program called the Protocol Analyzer can be used for testing the 5580 that communicates through the 5580 RS232 port to a PC host running the Protocol Analyzer and uses this protocol . This allows manual simulated testing of commands and data to/from the 5580and the PC. The RS232 format is 9,600 baud, 1 start bit, 8 data bits, and 1 stop bit. This is a four wire connection with Transmit (TX), Receive (RX), Clear To Send (CTS) and Ground. The 5580 interface is half duplex where the host is the master. The initial handshaking for a command is for the host to raise the CTS signal to the 5580. The 5580 acknowledges with an acknowledge packet (06h) and then the host issues a command packet. The CTS is held high by the host until a good command packet has been acknowledged from the 5580.

API Command Packet Structures

The command packet is transmitted from the host to the 5580. It is the beginning of a communications sequence. The packet has the following structure:

<STX><ADD><CMD><LEN><DTA><ETX><CHK>

Where:

STX ASCII Character For Start Of Text - 02h
ADD Device Address - this byte must be one (1) (this byte allows the use of the Protocol Analyzer for simulated debugging)
CMD Command Byte - 80h as described in section III
LEN Length of Data Packet (5d)
DTA Packet Data (contains the number of bytes specified in LEN)
ETX ASCII Character For End of Text - 03h
CHK Checksum Of Packet Data - the XOR (exclusive OR) of all bytes from STX to ETX
Minimum Packet Length - 6 Bytes
Maximum Packet Length - 70 bytes (6 bytes packet format + 64 bytes data)

API Response Packets - The response packet is transmitted from the 5580 to the host. It is the termination of a communications sequence. The packet has the following structure:

<STX><ADD><RSP><LEN><DTA><ETX><CHK>
Where:
STX ASCII Character For Start Of Text - 02h
ADD Device Address - this byte is not used in this application and must be one (1)
RSP Command Byte – as described below LEN Length of Data Packet (1 - 22d)
DTA Packet Data (contains the number of bytes specified in LEN)
ETX ASCII Character For End Of Text - 03h
CHK Checksum Of Packet Data - the XOR (exclusive OR) of all bytes from STX to ETX
Minimum Packet Length - 6 Bytes
Maximum Packet Length – Theoretical 261 bytes (6 bytes packet format + 255 bytes data)

Responses to a Host Command Packet are:

06h Command accepted
FAh Error in size of data packet (ETX not found where expected)
FCh Data value is invalid
FDh Command packet not completed (timeout occurred – 100 Msec without a complete packet received)
FEh Unrecognized command code
FFh Checksum error in command packet

If the response code is not ‘Command Accepted’ then the host must retransmit the command packet.

Command Formats are:

80h – SEND ESCROW VALUE

<STX><01><80h><02h><AMT><ETX><CHK>

This command sends an Escrow value from the host to the 5580. The AMT is two bytes, MSB (Most Significant Byte) followed by LSB (Least Significant Byte). The least significant bit of the least significant byte (LSB) is five cents.

An example command in hex could be:

<2><1><80><2><0><96><3><14>

Where :

<02h> = Data Byte Count of 2

<01h> = Device address of 1

<0h><96h> = 96 hex nickels (150) which is a $7.50 Escrow (note that Escrow must be rounded to five cents before transmitting)

<03h> = 'ETX' or End of Text (data)

<14h> = Checksum

The return message from the 5580 would be the following if the packet command has the correct checksum:

<STX><01><06h><00><ETX><CHK>

Where ETX is <03h> and CHK is <06h>. After a good return status message, the 5580 Escrow is updated and displayed. The bill acceptor and coin acceptor are both disabled so that only the new Escrow is utilized.

If a checksum error is found in the packet, the 5580 will respond with:

<STX><01><FFh><00><ETX><FFh>

81h REQUEST REMAINING ESCROW <STX><01><81h><1><SEQ><STATUS><ETX><CHK>

This command requests the remaining 5580 Escrow immediately be sent to the host. Then the Escrow is cleared to zero in the 5580. Also the bill acceptor and coin acceptor are enabled and normal operation occurs.

The Return Response messages from the 5580 would be the following if the command packet checksum was correct:

<STX><01><06h><02h><AMT><ETX><CHK>

This command sends an Escrow value from the 5580. The AMT is two bytes, MSB (Most Significant Byte) followed by LSB (Least Significant Byte). The least significant bit of the least significant byte (LSB) is five cents.

An example command in hex could be:

<2><1><06><2><0><96><3><92>

Where :

<02h> = Data Byte Count of 2

<01h> = Device address of 1.

<06h> = Acknowledge command accepted and response follows

<0h><96h> = 96 hex nickels (150) which is a $7.50 Escrow (note that Escrow must be rounded to five cents before transmitting)

<03h> = ‘ETX’ or End of Text (data)

<92h> = Checksum

If a checksum error is found in the packet, the host will respond with:

<STX><01><FFh><00><ETX><FFh>

The 5580 will respond with a retransmit of the packet.

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INFORMATION FOR CECB4 5580 API SERIAL ADAPTER CABLE
June 11, 2004

This is to document an adapter cable from the P15 AUX port 2x5 connector to a DB-9 Male connector. Use an off the shelf standard Female DB-9 to Female DB-9 separate cable to the PC. This off the shelf cable must have the Transmit (TX) and Receive (RX) lines reversed in the cable as well as the Request to Send (RTS) and Clear to Send (CTS) reversed. Note that this main PC cable is NOT a null modem cable. There are three main general types of cables for the PC, Straight Through, Main Signals Reversed (need here) and Null Modem.

SHORT ADAPTER CABLE PINOUTS:

P15 FEMALE	DB-9 MALE	
1	5	Ground
4	2	Receive Data (RX)
5	3	Transmit Data (TX)
6	8	Clear to Send (CTS)

Note that to locate Pin 1 on the P15 connector, use an OHM meter to locate the ground pin. Then looking at the female end of the flat ribbon cable, Pin 1 should be in the upper left and the pins are zig-zag upper left to bottom left then over to the right one place and upper to lower again, pins 3 and 4 for example.

[END OF DOCUMENT]