SHARP   SERVICE MANUAL

ER-A457
ONLINE COMMUNICATION FUNCTION

ELECTRONIC CASH REGISTER

MODEL ER-A457

(For "V" version)

CONTENTS

Parts marked with " ⚠ " is important for maintaining the safety of the set. Be sure to replace these parts with specified ones for maintaining the safety and performance of the set.

SHARP CORPORATION

CHAPTER 1. OVERVIEW

1. GENERAL

This is a specification of the on-line data communication via RS-232
interface of the ER-A457
It enables the ER-A457 to perform on-line communication.
For on-line data communication a ER-457 can be connected
to a host computer. Also, their connection can be made via modems.
We support mainly the following functions.

a) The function of ONLINE

   1) Down load of ECR data   (ECR $\leftarrow$ PC)

   2) Up load of ECR data   (ECR $\rightarrow$ PC)

   3) RJE (Remote job entry) function (ECR $\leftarrow$ PC)

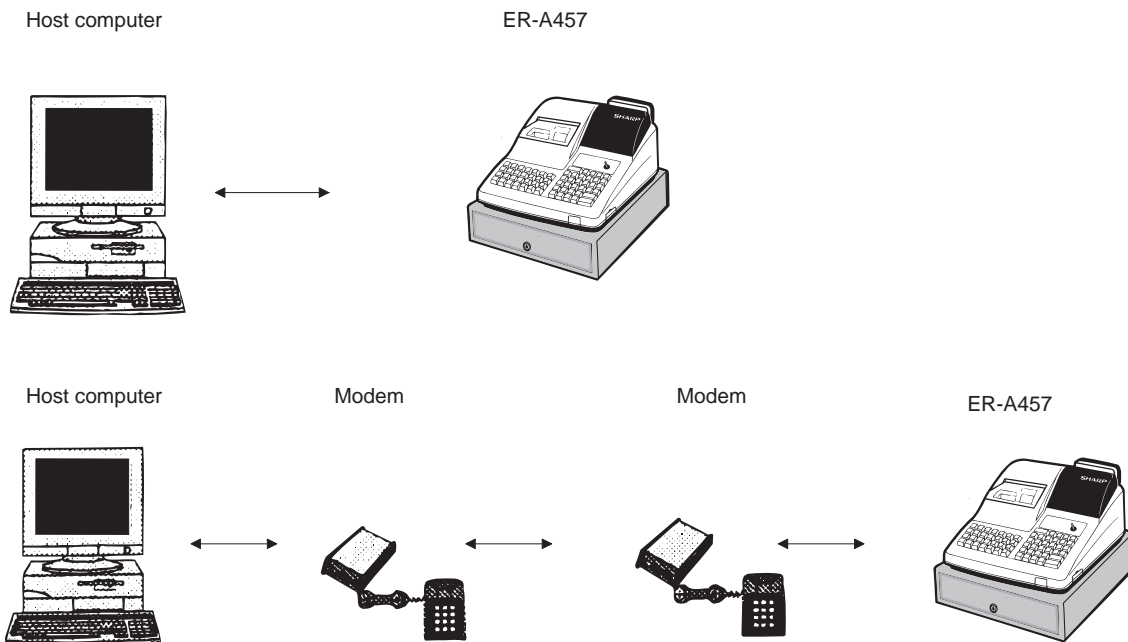   4) ELECTRONIC MAIL function   (ECR $\leftarrow$ PC)

CHAPTER 2. SYSTEM CONFIGURATION

1. GENERAL

Online data communication is allowed only when RS232 channel
presets at PGM2 mode.

2. Online data communication

(a) Direct connection

Host computer   ER-A457

Host computer   Modem   Modem   ER-A457

* The picture of ECR is shown the ordinary ECR.
(It may not be same design as ER-A457.)

CHAPTER 3. SPECIFICATIONS OF RS-232 INTERFACE

1. Online interface

a) Interface : RS-232

b) Duplex type : Half-duplex / Full-duplex

c) Line configuration : Direct connection/Modem connection

d) Data rate : 19200, 9600, 4800, 2400, 1200, 600 and 300 bps (Programable)

e) Synchronizing mode : Asynchronous

f) Parity check : Vertical parity check (odd)

g) Code : ASCII

h) Bit sequence : LSB first

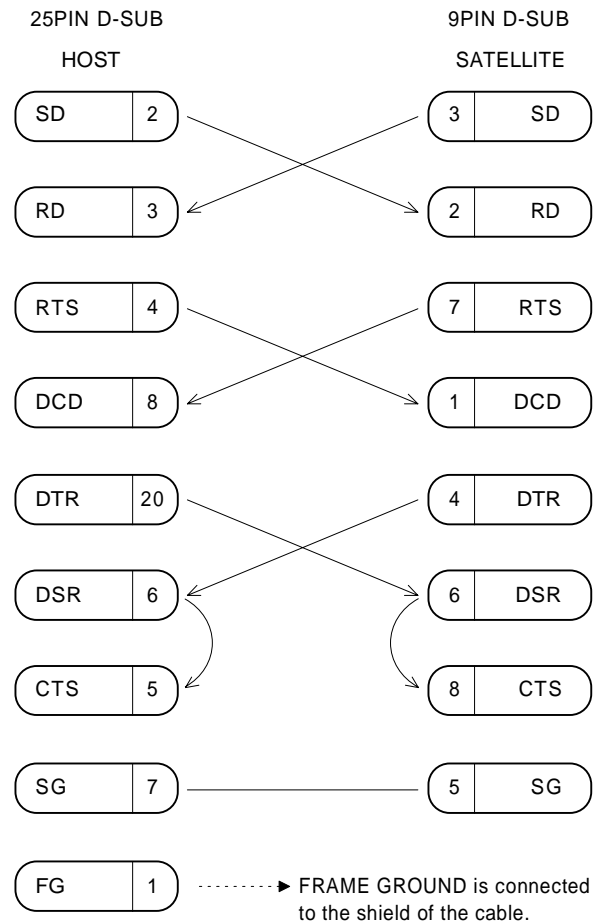i) Data format : 1 start bit + 7 data bits + 1 parity + 1 stop bit

	b1	b2	b3	b4	b5	b6	b7	P	

Start-bit   Data-bit   Parity-bit   Stop-bit
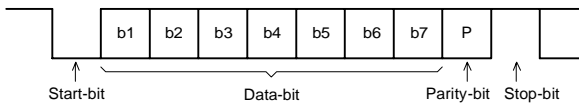
j) Protocol : Polling/selecting (Simple procedure)

k) Transmission line :

    Cable : Shielded cable

    Connector (ECR side) : D-sub 9 pin (female type) connector Inch pitch (4-40 UNC) lock screw

    Connector cover : Shielded cover

The table shows the relationship between the data rate and the recommended cable length.

Data rate	Recommended cable length
19,200 bps	3.75 meters
9,600 bps	7.5 meters
4,800 bps	15 meters
2,400 bps	30 meters
1,200 bps	60 meters

CHAPTER 4. SIGNAL CONNECTION DIAGRAM

1. Connection between the master (Host) and Satellite

25PIN D-SUB	9PIN D-SUB
HOST	SATELLITE

SD 2 → 3 SD
RD 3 ← 2 RD
RTS 4 → 7 RTS
DCD 8 ← 1 DCD
DTR 20 → 4 DTR
DSR 6 ← 6 DSR
CTS 5 ← 8 CTS
SG 7 ——— 5 SG

FG 1 ·······► FRAME GROUND is connected to the shield of the cable.

SD : TRANSMITTED DATA
RD : RECEIVED DATA
DTR : DATA TERMINAL READY
DSR : DATA SET READY
RTS : REQUEST TO SEND
DCD : DATA CARRIER DETECTOR
CTS : CLEAR TO SEND
FG : FRAME GROUND

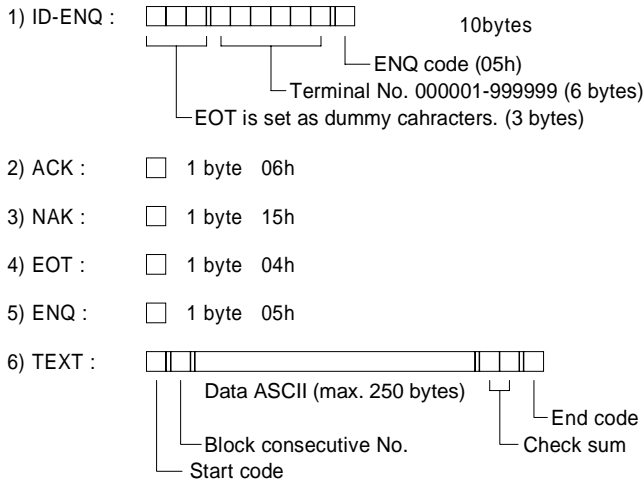✽ If the connector of Host side is "9 PIN D-SUB", the pin number is same as Satellite side.

2. Connection between the terminal and MODEM
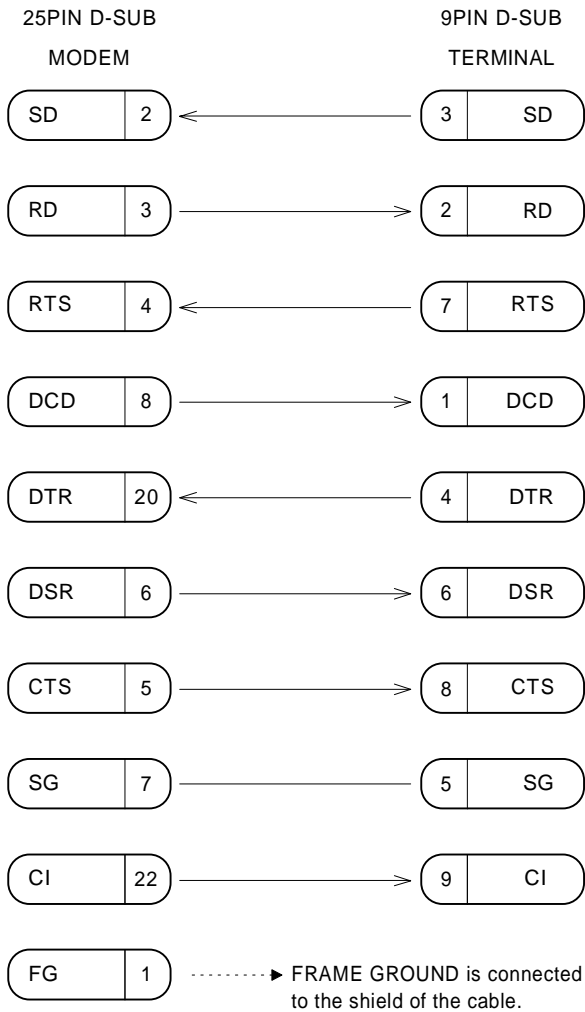
25PIN D-SUB				9PIN D-SUB	
MODEM				TERMINAL	
SD	2	←		3	SD
RD	3	→		2	RD
RTS	4	←		7	RTS
DCD	8	→		1	DCD
DTR	20	←		4	DTR
DSR	6	→		6	DSR
CTS	5	→		8	CTS
SG	7	—		5	SG
CI	22	→		9	CI

FG	1	·······► FRAME GROUND is connected to the shield of the cable.

SD : TRANSMITTED DATA
RD : RECEIVED DATA
DTR : DATA TERMINAL READY
DSR : DATA SET READY
RTS : REQUEST TO SEND
DCD : DATA CARRIER DETECTOR
CTS : CLEAR TO SEND
CI : CALLING INDICATOR
FG : FRAME GROUND

CHAPTER 7. DATA BLOCK FORMAT

1. Basic format

1) ID-ENQ : ☐☐☐☐☐☐☐☐☐☐ 10bytes

- ENQ code (05h)
- Terminal No. 000001-999999 (6 bytes)
- EOT is set as dummy cahracters. (3 bytes)

2) ACK : ☐ 1 byte 06h

3) NAK : ☐ 1 byte 15h

4) EOT : ☐ 1 byte 04h

5) ENQ : ☐ 1 byte 05h

6) TEXT : ☐☐☐ .... ☐☐☐

- Data ASCII (max. 250 bytes)
- End code
- Block consecutive No.
- Check sum
- Start code

Start code : This code may not be provided.
Null is impermissible.

End code : This code may not be provided.
Null or any same code as the start code is not permissible.

When master reset is performed, the default is assumed:
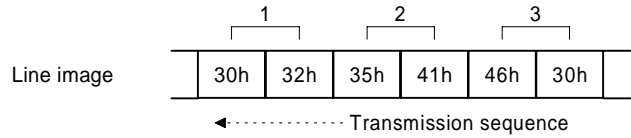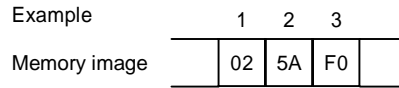
Start code = 02h

End code = 0Dh

Block consecutive No. : This number starts with 30h and cycles like this: 30h, 31h — 39h, 30h, 31h (Ring counter system)

Check sum : 2 bytes hex number
Low-order 8-bit data of the complement of 2 for the sum of text data.

RAM data: : Even number of data that is obtained by dividing one byte of RAM data into high-order 4 bits and low-order 4 bits and converting them to ASCII codes shown in the code conversion table.

Code conversion table .

Print code (high-order or low-order 4 bits)		Line image
Bit image	Hexadecimal	ASCII
0000	0	30h
0001	1	31h
0010	2	32h
0011	3	33h
0100	4	34h
0101	5	35h
0110	6	36h
0111	7	37h
1000	8	38h
1001	9	39h
1010	A	41h
1011	B	42h
1100	C	43h
1101	D	44h
1110	E	45h
1111	F	46h

Example

Memory image

	1	2	3	
	02	5A	F0	

Line image

	1		2		3	
	30h	32h	35h	41h	46h	30h

◄ · · · · · · · · · · · Transmission sequence

CHAPTER 8. ONLINE application

1. ONLINE preset

1) SRV programming: NONE

2) PGM programming

Job#	PGM-MODE programming for online operation
2690	The assignment of RS232 channel by each devices.
6110	Programming of the terminal number
6111	Programming of the modem control
6112	Programming of the transmission data rate (Bau rate)
6113	Programming of the start and end code.
6115	Programming of time out value
6110	Online Preset reading

[JOB#2690] MRS = 0000
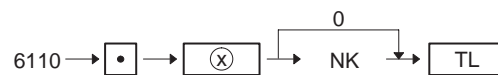
The assignment of RS232 channel by each devices.

2690 → • → ⊗ → X → ⊗ → ABCD → ST → TL
(with 0 above)
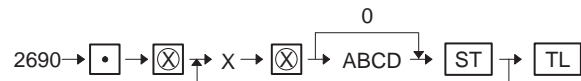
X: 1

A:

	On-line	2690-A
	No	0
	Yes (Channel No. = 8)	8

[JOB#6110] MRS = 000001

Programming of the terminal number

6110 → • → ⊗ → NK → TL
(with 0 above)

NK: Terminal No. = 0 to 999999

[JOB#6111] MRS = 00

Programming of the modem control

$$6111 \rightarrow \boxed{\bullet} \rightarrow \boxed{\text{x}} \xrightarrow{\quad 0 \quad} AB \rightarrow \boxed{\text{TL}}$$
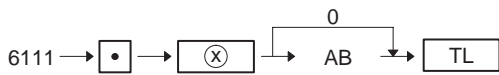
6111-A: 1. Sensing of the CI signal Yes/No

1. Sensing of the CI signal	6111-A
No	0
Yes	1

6111-B: 1. Duplex type

1. Duplex type	6111-B
Full duplex system	0
Half duplex system	1

[JOB#6112] MRS = 5

Programming of the transmission baud rate

$$6112 \rightarrow \boxed{\bullet} \rightarrow \boxed{\text{x}} \xrightarrow{\quad 0 \quad} A \rightarrow \boxed{\text{TL}}$$
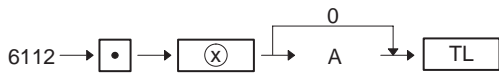
6112-A: Transmission baud rate

Transmission baud rate	6112-A
300 bps	0
600 bps	1
1200 bps	2
2400 bps	3
4800 bps	4
9600 bps	5
19200 bps	6

[JOB#6113] MRS = 002013

Programming of the start and end code

$$6113 \rightarrow \boxed{\bullet} \rightarrow \boxed{\text{x}} \xrightarrow{\quad 0 \quad} XXXYYY \rightarrow \boxed{\text{TL}}$$
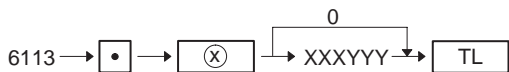
XXX: Start code = 02H (STX)
YYY: End code = 0DH (CR)

[JOB#6115] MRS = 007

Programming at the time-out value.

$$6115 \rightarrow \boxed{\bullet} \rightarrow \boxed{\text{x}} \rightarrow XXX \rightarrow \boxed{\text{TL}}$$

XXX: 1 ~ 255 sec

[JOB#6110]

Online preset reading

$$6110 \rightarrow \boxed{\text{x}} \rightarrow \boxed{\text{TL}}$$

SHARP