SPENDEX 40

SPEECH ENCRYPTION DECRYPTION EQUIPMENT
TYPE UA 8251/00 AND /01

Installation and Comsec Manual

PHILIPS USFA BV

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CONTENTS

Abbreviations

CIK   Crypto Ignition Key
DTE   Data Terminal Equipment
EKD   Electronic Key Distribution
ID   Identification
IVSN   Initial Voice Switched Network
KDC   Key Distribution Centre
Ptt   Press to talk
STU-II   Secure Telephone Unit (second generation)

Definitions

CIK module:
Programmed module, unique per terminal, required for crypto operation.

Electronic Key Distribution:
A system by which key variables are generated and then transmitted by
electronic means.

Full Duplex:
Mode of transmission in which, at the two ends of a link, speech (data) can be
transmitted and received simultaneously.

Half Duplex:
Mode of transmission in which there is alternate transmission of speech (data)
from one end of a link and reception of speech (data) at the other.

ID Number:
5-digit number, unique per terminal, assigned to those terminals that can
operate in the KDC mode.

KDC Call Variable:
Key variable for normal use in KDC mode, issued by the Key Distribution Centre
for producing encrypted traffic with a terminal of type SPENDEX 40 or STU-II.

KDC Unique Variable:
Key variable, unique per terminal, required for the decryption of a KDC call
variable.

Key Distribution Centre:
Central unit which can issue a call variable on request.

Net Variable:
Key variable for producing encrypted traffic with a terminal of type
SPENDEX 40. One Net variable, the emergency Net variable can be used also for
encrypted traffic with a terminal of type STU-II. The emergency Net variable
shall be used only if for some reason or other no KDC key variables are
available.

Pulse Dialling:
Dialling mode in which, during the dialling of a telephone number, a series of
pulses is transmitted for each digit.

Secure Telephone Unit:
Speech encryption/decryption terminal of the type TSEC/KY-71A.

Tone Dialling:
Dialling mode in which, during dialling of a telephone number, two tones of different frequency are transmitted for each digit (Dual Tone Multi Frequency).

1   INTRODUCTION

1.1   <u>General</u>

This manual contains installation and comsec instructions for the
digital speech encryption/decryption equipment SPENDEX 40, types
UA 8251/00 and /01.

1.2   <u>Technical Description</u>

The speech encryption/decryption terminal SPENDEX 40 is a terminal
with which secure communication is possible via standard telephone
lines or radio links. For secure communication via a radio link the
connection of a special radio modem is required.
The terminal can be used also as a normal telephone for nonsecure
communication.

Secure communication is possible in the Net and KDC mode. When used
in the KDC mode, secure communication is also possible with a
terminal of type STU-II.

The SPENDEX 40 is designed for the operating modes of nonsecure
speech, secure speech and secure data.

Equipment type UA 8251/00 (STU-II interoperable) is fitted with a
V26/V26bis modem, so that secure communication is possible in the
2-Wire Half Duplex or 4-Wire Full Duplex transmission mode.
Equipment type UA 8251/01 (not interoperable with STU-II) is fitted
with a V22bis modem, so that secure communication is possible only in
the 2-Wire Full Duplex mode.

The terminal can operate in Pulse Dialling or Tone Dialling mode. In
the Tone Dialling mode, with an appropriate network, a link can be
set up with a certain precedence level. A choice can be made of four
precedence levels: priority, immediate, flash, and flash override.

1.3   <u>Mechanical Construction</u>

The terminal is a compact appliance constructed of modules and
primary designed for office use. For mobile use a shock mounting is
available.

2   TECHNICAL DATA

2.1   Identification

           Name   : Speech encryption/decryption equipment SPENDEX 40
           Type   : UA 8251/00 or UA 8251/01
           Manufactured by : Philips Usfa B.V. Eindhoven

2.2   Configuration

           Terminal   : UA 8251/00 or UA 8251/01
           Handset   : UA 8252/00
           Line connecting cable   : UA 8240/00 (PTT) or UA 8240/01 (IVSN)
           Mains power supply cable : 5722 660 30670
           CIK module   : UA 8247/00
           Shock mounting   : UA 8254/00
           Transport case   : UA 8342/00
           Set spare fuses   : 2 x 250 V/500 mA slow (2422 086 01015)
                                       2 x 110 V/1 A slow (2422 086 01021)

2.3   Speech Digitising

           Linear Predictive Coding (LPC-10) in accordance with STANAG 4198

2.4   Data Interface

           Signal level : in accordance with CCITT recommendation V24/V28 or
                           EIA standard RS 232C
           Bit rate   : 2400 bit/s

2.5   Modem Interface

           Signal level : in accordance with CCITT recommendation V24/V28
           Bit rate   : 2400 bit/s

2.6   Line Interface

           Speech:
           - signal form   : analogue
           - frequency range : 80...3400 Hz

           Data (equipment type UA 8251/00 with V26/V26bis modem UA 8314/00):
           - signal level   : in accordance with CCITT recommendation
                                    V26/V26bis
           - bit rate   : 2400 bit/s
           - transmission rate : 1200 Bd
           - carrier frequency : 1800 Hz
           - output level   : adjustable from -23 dB to +4 dB

Data (equipment type UA 8251/01 with V22bis modem UA 8343/00):
- signal level   : in accordance with CCITT recommendation
                        V22bis
- bit rate   : 2400 bit/s
- transmission rate   : 600 Bd
- carrier frequencies : 1200 Hz (low channel)
                        2400 Hz (high channel)
- output level   : adjustable from -24 dB to +6 dB

2.7   Terminal Settings

Possibility of optionally Half Duplex or Full Duplex transmission
mode: HD/FD

Adjustment of the synchronisation to the type of modem (line or radio
modem): LF/HF

Adaptation to 2-Wire or 4-Wire network: 2W/4W

Possibility of optionally Pulse Dialling or Tone Dialling: PD/TD

Adjustment of the ringing signal volume: RV1...RV4

2.8   Power Supply

Mains voltage   : 110 or 220 V ± 15 %, 47...63 Hz
Power consumption   : 45 W max.
Fuses   : 2 x 110 V/1 A slow or
                      2 x 250 V/500 mA slow

2.9   Battery

Type   : 3.9 V penlight UA 6303/00
Voltage : 3.5...4.5 V

2.10   Environmental Conditions

Temperature:
- operational   : -10 °C to +50 °C
- nonoperational : -40 °C to +70 °C (during storage and transport)

Relative humidity:
- operational   : 95 % maximum
- nonoperational : 90 % maximum (during storage and transport)

Radiation:
- the emitted radiation (TEMPEST) complies with the requirements of
  AMSG-720B
- the equipment meets the EM requirements of MIL-STD-461B

Vibration/shock:
when mounted on shock mounting type UA 8254/00 the equipment meets
vibration and shock requirements according to DEF STAN 07-55:
- vibration, test A2
- shock, test A5

2.11   Physical Data

Dimensions   : 38.5 cm x 27 cm x 16/23 cm
Weight   : 12 kg approx.

3   SECURITY

3.1   Physical Security

           The terminal can operate in a secure mode only if the CIK module
           corresponding specifically to the terminal is connected. In this way
           the CIK module represents physical security against unauthorised use
           in the secure mode. Without the CIK module, the terminal can be used
           only as a normal telephone for nonsecure communication.

           The CIK module is tested automatically each time it is connected. If
           its contents (i.e. the CIK) are valid, then "CIK OK " (terminal
           loaded) or "NUL.CIK " (terminal empty and CIK=0) appears in the
           display for 3 s. If the CIK is not valid, then "ILL.CIK " or
           "ERR.CIK " appears in the display.

3.2   General Zeroise

           Pressing of the ZEROIZE push button makes all stored key variables
           unusable, whether the supply is switched on or off. If the supply
           voltage is present, "%ALARM " appears in the display and shortly
           after that "ZEROISED". Furthermore the contents of a CIK module that
           may be connected will be destroyed.
           Only after new key variables have been loaded will it be possible to
           use the terminal again for secure communication.

4   CONTROLS AND CONNECTIONS (see Fig. 4.1 and Fig. 4.2)

4.1   Switches

4.1.1   On/Off Switch

The function of this switch is to switch the supply voltage on and
off.

4.1.2   Hook Switch

The hook switch detects the picking up and replacing of the handset.
Picking up leads to going off hook, so that the terminal is switched
to the line. Replacing leads to going on hook, so that the terminal
is switched off the line. During the replacing of the handset an
alarm that may be present is reset.

4.1.3   Ptt Switch

The Ptt switch has the function of switching on the transmitter of
the modem during a secure conversation. The switch need to be
operated only in the Half Duplex transmission mode. In the Full
Duplex transmission mode the Ptt switch has no function. The Ptt
switch is mounted in the handset.

4.2   Push Buttons

4.2.1   SECURE Push Button

After a clear call has been set up, pressing the SECURE push button
causes switching of the modem to the line and, after synchronisation
has been achieved with the terminal at the other end, the transition
to a secure call on the basis of a previously selected Net variable
or KDC call variable.

4.2.2   ZEROIZE Push Button

When the ZEROIZE push button is pressed, all key variables that are
stored will be rendered useless. If the supply voltage is present,
then moreover the contents of a possibly present CIK module will be
destroyed.

4.3   Keyboard

The terminal is equipped with a keyboard consisting of four rows of
four keys each. The functions of the keys can be divided into three
categories:
- telephony functions
- set-up functions
- comsec functions

4.3.1   Telephony Functions

4.3.1.1 Numerical Keys 0...9

The numerical keys 0...9 are used for introducing the numerals 0...9.

4.3.1.2 P Key (P = Precedence)

By means of this key a precedence level can be selected. This is only
possible when the transmission network is suited for precedence level
selection and when the terminal is set to Tone Dialling.

4.3.1.3 KDC Key

Pressing of the KDC key indicates that an identification number of 5
digits will be dialled in.

4.3.1.4 NET Key

Pressing of the NET key indicates that a compartment number of 2
digits will be dialled in.

4.3.1.5 DTE Key

Pressing of the DTE key during secure traffic changes the operating
mode of the terminal from speech to data or from data to speech.

4.3.1.6 * Key

This key is reserved for a function in the Tone Dialling mode.
Pressing of the * key in the telephony on hook substate sets the
terminal in the called mode for 6 s.

4.3.1.7 # Key

This key is reserved for a function in the Tone Dialling mode.

4.3.2   Set-up Functions

4.3.2.1 Numerical Keys 0...9

The numerical keys 0...9 are used to introduce the numerals 0...9. In
the terminal set-up substate key 2 is used to set the terminal to the
2-wire link and key 4 to set the terminal to the 4-wire link. In the
ringing signal volume set-up substate the keys 1...4 are used to
modify the ringing signal volume.

4.3.2.2 P Key (P - Procedure)

The P key is used to terminate an action.

4.3.2.3 KDC Key

Pressing of the KDC key in the terminal set-up substate changes the
Full/Half Duplex setting of the terminal.

4.3.2.4 NET Key

Pressing of the NET key in the terminal set-up substate changes the
Low/High Frequency setting of the terminal (internal/external modem
selection).

4.3.2.5 DTE Key

Pressing of the DTE key has the consequence that the preceding action
is cancelled, on condition that the P key has not yet been pressed.
The terminal returns to the set-up wait state.

4.3.2.6 * Key

Pressing of this key in the terminal set-up substate modifies the
Tone/Pulse Dialling setting of the terminal.

4.3.2.7 # Key

Pressing of this key in the check out substate has the consequence
that the terminal retrieves the first subsequent filled compartment
and sets its contents in the display.

4.3.3   Comsec Functions

4.3.3.1   Numerical Keys 0...9

The numerical keys 0...9 are used to introduce the numerals 0...9.

4.3.3.2   P Key (P = Procedure)

The P key is used to terminate a loading, updating, or zeroising action.

4.3.3.3   KDC Key

The KDC key has no comsec function.

4.3.3.4   NET Key

Pressing of the NET key in the comsec wait state indicates that a loading action follows. The terminal goes into the fill substate and expects a two-digit compartment number or a two-digit code.

4.3.3.5   DTE Key

Pressing of the DTE key has the consequence that the loading, updating, or zeroising action is omitted, on condition that the P key has not yet been pressed.

4.3.3.6   * Key

Pressing of the * key in the comsec wait state or after code 24111 in the telephony on hook substate indicates that an update action follows. The terminal goes into the update substate and expects a two-digit compartment number or a two-digit code.

4.3.3.7   # Key

Pressing of this key in the comsec wait state indicates that a zeroise action follows. The terminal goes into the zeroise substate and expects a two-digit compartment number or a two-digit code.

4.4   Indications

4.4.1   LED

The LED is located behind the display window. When illuminated, the
LED indicates that the terminal is operating in the secure data mode.
The LED has also an alarm function. It will flash as soon as a fatal
hardware alarm is detected during the self-test; an acoustic signal
is also produced.

4.4.2   Display

The terminal is provided with an eight-character alphanumeric
display. This display provides information for the user about the
state of the terminal.

4.5   Connections

4.5.1   Fill-gun Connector

Connector for connecting a key variable loading device.

4.5.2   CIK Connector

Connector for connecting the CIK module.

4.5.3   Handset Connector

Fixed socket connector for connecting the handset.

4.5.4   Data Connector

25-pole connector for connecting a data terminal equipment.

4.5.5   Line Connector

9-pole connector for connecting the line connecting cable.

4.5.6   Modem Connector

25-pole connector for connecting a radio modem.

4.5.7   Mains Connection

Connection for the 110/220 V mains voltage.

4.5.8   Earth Connection

Terminal connection for "security" earth.

4.6   Mains Voltage Selector

The function of the mains voltage selector is to set the power supply
to the appropriate input voltage (110 V or 220 V).

4.7   Fuse Holders

Fuses   : 2 x 110 V/1 A slow or
          2 x 250 V/500 mA slow

4.8   Battery Compartment

The battery compartment contains a penlight battery, which retains
the key variables during a power breakdown.

5   INSTALLATION

5.1   Mains Voltage Setting

The power supply can be set to an input voltage of 110 V or 220 V. To which input voltage the power supply is set is visible behind the window of the mains voltage selector. To change the setting, proceed as follows (see Fig. 5.1):

(1) Unscrew the twelve captive socket-head screws securing the power supply unit.

(2) Take the power supply unit out of the terminal carefully.

(3) Remove the cover plate of the mains voltage selector.

(4) Unscrew the switching panel and change the setting by transposing the cable tags:

    110 V : green wire to contact pin D
             blue wire to contact pin A

    220 V : green wire to contact pin B (or C)
             blue wire to contact pin C (or B)

(5) Screw down the switching panel again.

(6) Mount the cover plate in such a way that the value of the new input voltage becomes visible in the window.

(7) Replace the power supply unit and screw down the twelve captive socket- head screws again.

(8) Replace the fuses:

    110 V : 2 x 110 V/1 A slow

    220 V : 2 x 250 V/500 mA slow

5.2   Connector Pin Allocation

5.2.1   Fill-gun Connector

    A   Output Vref
    B   Input SWITCHED GROUND
    C   In/output REQUEST
    D   In/output DATA
    E   In/output CLOCK

5.2.2   CIK Connector

A
B   Output CLOCK
C
D   Input CIK CONNECTED
E   Output STORE
F   Ground
H   Output DATA IN
J   Input DATA OUT
K   Output WRITE
L   Output SWV

5.2.3   Handset Connector

1   Output TEL1
2   Output TEL2
3   Input PTT/
4   Input MIC1
5   Input MIC2

5.2.4   Data Connector

1
2   Input 103 (transmit data)
3   Output 104 (receive data)
4   Input 105 (request to send)
5   Output 106 (ready for sending)
6   Output 107 (data set ready)
7   Signal ground (102)
8   Input 109 (data channel received line signal detector)
9   Frame ground
10
11
12
13
14
15   Output 114 (transmit clock)
16
17   Output 115 (receive clock)
18
19   Input 120 (transmit backward channel line signal), not used
20   Input 108 (data set ready)
21
22
23
24
25

5.2.5   Line Connector

        1   In/output LINE IN/OUT 1
        2   In/output LINE IN/OUT 2
        3   Output LINE OUT 1
        4   Output LINE OUT 2
        5
        6
        7   Ground
        8
        9

5.2.6   Modem Connector

        1   Ground
        2   Output 103 (transmit data)
        3   Input 104 (receive data)
        4   Output 105 (request to send)
        5   Input 106 (ready for sending)
        6   Input 107 (data set ready)
        7   Signal ground (102)
        8   Input 109 (data carrier detect)
        9
       10
       11
       12
       13
       14
       15   Input 114 (transmit clock)
       16
       17   Input 115 (receive clock)
       18   Output 141 (local loopback)
       19
       20   Output 108 (data terminal ready)
       21
       22   Ground
       23
       24
       25

5.3   Connections Telephone Connector

        The line connecting cable is provided with a standard PTT or IVSN
        telephone connector. If this telephone connector doesn't fit on the
        local connection box to the telephone exchange, then it has to be
        replaced. The wiring diagrams for both a 2-Wire connection and 4-Wire
        connection are given in Fig. 5.2.

        Note: If in a 2-Wire connection the ringing signal is received via a
              separate wire EB, then this EB wire has to be interconnected
              with the non-return wire (a or b) to the telephone exchange.

5.4   Battery Replacement

The battery should be replaced twice a year. Refer to the date on the
battery cover plate for last replacement of the battery. Replace the
battery as follows:

(1) Unscrew the four captive socket-head screws securing the battery
    cover plate.

(2) Remove the battery cover plate.

(3) Remove the old battery and insert a new one.

(4) Replace the battery cover plate and screw down the four captive
    socket-head screws again.

(5) Change the battery replacement date.

5.5   Use of Shock Mounting

Because the terminal is designed primarily for use on a desk, a shock
mounting should be fitted for mobile use. The necessary arrangements
are incorporated on the underside of the enclosure. Fig. 5.3 shows
how to fit the terminal to the shock mounting, together with the
positions of the four holes needed for attaching the shock mounting
to a table or bench.

5.6   Switching on of the Terminal

The terminal is switched on by putting the on/off switch in the "ON"
position. After the switching on, the terminal commences with an
initiation procedure, which is followed by an automatic self-test.
During the self-test procedure "TESTING " appears in the display (not
implemented in all terminals). If during the self-test no errors are
detected, "*   " appears in the display and the terminal is ready
for operation. If self-testing does reveal an error, a report
depending on the cause appears in the display. If a fatal hardware
alarm is concerned, then the LED will furthermore begin to flash and
an alarm signal becomes audible.

5.7   Set-up Instructions

The set-up instructions are limited to:
- the modifying of the terminal settings;
- the modifying of the ringing signal volume;
- the modifying of the key codes;
- the inspecting of the content of a compartment;
- the dialling in/modifying of a user password;
- the dialling in/modifying of the ID number;
- the causing of tests to be performed.

A set-up procedure is possible only after the dialling in of a
password (see set-up start procedure).

Each set-up procedure can be terminated or interrupted on pressing of
the DTE key or by going off/on hook. On pressing of the DTE key the
terminal returns to the set-up wait state and "XX ?   " appears in
the display. If one goes off/on hook, the terminal returns to the
telephony on hook substate and "*   " appears in the display.

5.7.1   Set-up Start Procedure

To prevent the terminal from being brought in error into one of the
set-up substates, a password must first be dialled in. This password
is 012345, which is the same for each terminal. A time of 10 s is
available for the dialling in of the password, thereafter the
terminal automatically returns to the telephony on hook substate and
"*   " appears in the display.

Actions	LED	Display	Remarks
Start conditions: - Terminal on hook		"* "	Terminal in telephony on hook substate.
1. Press P key.		"SET UP ?"	
2. Dial in password 012345.		"SET UP ?"	The digits do not become visible.
3. Press P key.		"XX ? "	Terminal in set-up wait state.

5.7.2   Terminal Set-up Procedure

In the terminal set-up substate it is possible to modify the settings of the terminal. The terminal has the following settings:
- Tone/Pulse Dialling
- High/Low Frequency
- 2-Wire or 4-Wire
- Half/Full Duplex

Actions	LED	Display	Remarks
Start conditions: - Terminal on hook		"XX ? "	Terminal in set-up wait state.
1. Dial in set-up code 10.		"10 "	
2. Press P key.		"xDxFxWxD"	Terminal in terminal set-up substate.
3. Change, if required, the Tone/Pulse Dialling setting by pressing the * key.		"XDxFxWxD"	TD = Tone Dialling PD = Pulse Dialling
4. Change, if required, the Low/High Frequency setting by pressing the NET key.		"xDXFxWxD"	LF = Low Frequency (internal modem) HF = High Frequency (external modem)
5. Change, if required, the 2-Wire/4-Wire setting by pressing key 2 or key 4.		"xDxFXWxD"	2W = 2-Wire 4W = 4-Wire
6. Change, if required, the Half/Full Duplex setting by pressing the KDC key.		"xDxFxWXD"	HD = Half Duplex FD = Full Duplex See Note 1.
7. Press P key.		"ACCEPTED"	

Note 1: With equipment type UA 8251/00, Full Duplex transmission is possible only in 4-Wire connection. With equipment type UA 8251/01 only 2-Wire Full Duplex transmission is possible.

5.7.3   Ringing Signal Volume Set-up Procedure

In the ringing signal volume set-up substate it is possible to modify the level of the ringing signal.

Actions	LED	Display	Remarks
Start conditions: - Terminal on hook		"XX ? "	Terminal in set-up wait state.
1. Dial in set-up code 20.		"20 "	
2. Press P key.		"RVx "	Terminal in ringing signal volume set-up substate.
3. Change, if required, the ringing signal level by pressing key 1, key 2, key 3 or key 4.		"RVX "	X = 1: level 1 X = 2: level 2 X = 3: level 3 X = 4: level 4 See Note 1.
4. Press P key.		"ACCEPTED"	

Note 1: Level 4 is the highest level and level 1 the lowest.

5.7.4   Telephony Set-up Procedure

All Net variables and KDC call variables are provided with a key
code. Valid key codes are 90 (the default value), 91 and 92. These
codes have no function in the present version of the equipment. They
are intended for future use, for example in coupling some information
(such as the synchronisation protocol) to the key variable, or in
marking it (e.g. as a key variable for calamities). In the telephony
set-up substate it is possible to modify one or more key codes.

Actions	LED	Display	Remarks
Start conditions: - Terminal on hook		"XX ? "	Terminal in set-up wait state.
1. Dial in set-up code 30.		"30 "	
2. Press P key.		"COMP+COD"	Terminal in telephony set-up substate.

3. Dial in compartment
   number (00...19,
   40...59).
		"AB "
		"AB ZZ VV"
		
		"AB -- VV"
			Net compartment selected.
			
			KDC compartment selected.

4. Change, if required,
   the key code. See
   Note 1.
		"AB ZZ WW"
		or
		"AB -- WW"	

5. Press P key.		"COMP+COD"	The new key code is being fixed, a following compartment can be selected.
AB = compartment number (AB = 00...19, 40...59) VV = existing key code (VV = 90, 91 or 92) WW = new key code (WW = 90, 91 or 92) ZZ = update number (ZZ = 01...99)			

Note 1: If changing of the key code is not required, then press P
        key. In the display then "COMP+COD" appears again.

5.7.5   Check Out Procedure

In the check out substate it is possible to check the contents of a
compartment by selecting that compartment, whereafter the
corresponding control group (Net compartment) or ID number (KDC
compartment) appears in the display; it is also possible to step
through the filled compartments by pressing of the # key.

Actions	LED	Display	Remarks
Start conditions: - Terminal on hook		"XX ? "	Terminal in set-up wait state.
1. Dial in set-up code 40.		"40 "	
2. Press P key.		"COMPART?"	Terminal in check out substate.
3. Dial in compartment number (00...19, 40...59).		"AB " "AB.-----"	Compartment empty.
		"AB.YYYY "	Compartment contains valid Net variable.
		"AB.CCCCC"	Compartment contains valid KDC call variable.
AB = compartment number (AB = 00...19, 40...59) CCCCC = ID number (C = 0...9) YYYY = control group (Y = A...P)			

If one wishes to step through the filled compartments, that can be
done by always pressing the # key. Each time after this key has been
pressed, the terminal seeks out the first subsequent filled
compartment and puts its contents in the display. After the last
compartment compartment 00 automatically has its turn again. If
meanwhile the P key has been pressed, the consequence is that the
terminal starts again with compartment 00.

5.7.6   Password Set-up Procedure

A user password enables the user to perform set-up actions himself.
In the password set-up substate a user password can be dialled in
with a length of 2 to 5 digits selected by the operator. It is also
possible to modify an existing password.

Actions	LED	Display	Remarks
Start conditions: - Terminal on hook		"XX ? "	Terminal in set-up wait state.
1. Dial in set-up code 50.		"50 "	
2. Press P key.		"PW=XXXXX" or "PW=TTTTT"	Terminal in password set-up substate.
3. Dial in (new) user password.		"PW=UUUUU"	
4. Press P key. See Note 1.		"ACCEPTED"	
TTTTT = existing user password (T = 0...9) UUUUU = (new) user password (U = 0...9)			

Note 1: If the P key is pressed at the moment when fewer than 2
        digits have been dialled in, the terminal will again request
        input ("PW=XXXXX" or "PW=TTTTT" appears in the display
        again).

5.7.7   Terminal Identification Procedure

In the KDC mode each terminal has its own ID number. During the
setting up of a secure call on the basis of a KDC call variable,
exchanging takes place of the two ID numbers in order to ascertain
whether a connection has been effected between the correct terminals.
In the terminal identification substate the ID number can be dialled
in or modified.

Actions	LED	Display	Remarks
Start conditions: - Terminal on hook		"XX ? "	Terminal in set-up wait state.
1. Dial in set-up code 60.		"60 "	
2. Press P key.		"ID=XXXXX" or "ID=CCCCC"	Terminal in terminal identification substate.
3. Dial in (new) ID number.		"ID=DDDDD"	
4. Press P key. See Note 1.		"ACCEPTED"	
CCCCC = existing ID number (C = 0...9) DDDDD = (new) ID number (D = 0...9)			

Note 1: If the P key is pressed at the moment when fewer than 5
         digits have been dialled in, the terminal will again request
         input ("ID=XXXXX" appears in the display again).

5.7.8   Test Procedures

In the test state the following tests can be performed:
- keyboard/display test
- switch test
- memory test
- modem test
- vocoder test
- timer test
- system test

It is not recommended to connect/disconnect the CIK module in the test state. During the tests CIK module manipulations may cause confusing display indications.

Actions	LED	Display	Remarks
Start conditions: - Terminal on hook		"XX ? "	Terminal in set-up wait state.
1. Dial in set-up code 70. 2. Press P key.		"70 " "TESTMODE"	 Terminal in test wait state.

5.7.8.1 Keyboard/Display Test Procedure

In the keyboard test substate it is possible to test the keyboard, the display and the tone dialling circuit.

Actions	LED	Display	Remarks
Start conditions: - Terminal on hook		"TESTMODE"	Terminal in test wait state.
1. Dial in test code 1.		"KBD TEST"	Terminal in keyboard test substate.
2. Press numerical key 0.		"00000000"	Tone audible.
3. Press numerical key 1.		"11111111"	Tone audible.
4. Press numerical key 2.		"22222222"	Tone audible.
5. Press numerical key 3.		"33333333"	Tone audible.
6. Press numerical key 4.		"44444444"	Tone audible.
7. Press numerical key 5.		"55555555"	Tone audible.
8. Press numerical key 6.		"66666666"	Tone audible.
9. Press numerical key 7.		"77777777"	Tone audible.
10. Press numerical key 8.		"88888888"	Tone audible.
11. Press numerical key 9.		"99999999"	Tone audible.
12. Press * key.		"********"	Tone audible.
13. Press # key.	X	" "	Tone audible.
14. Press DTE key.		"DTE KEY "	
15. Press KDC key.		"KDC KEY "	
16. Press NET key.		"NET KEY "	
17. Press P key.		"TESTMODE"	Terminal back to test wait state.

5.7.8.1 Keyboard/Display Test Procedure

In the keyboard test substate it is possible to test the keyboard, the display and the tone dialling circuit.

Actions	LED	Display	Remarks
Start conditions: - Terminal on hook		"TESTMODE"	Terminal in test wait state.
1. Dial in test code 1.		"KBD TEST"	Terminal in keyboard test substate.
2. Press numerical key 0.		"00000000"	Tone audible.
3. Press numerical key 1.		"11111111"	Tone audible.
4. Press numerical key 2.		"22222222"	Tone audible.
5. Press numerical key 3.		"33333333"	Tone audible.
6. Press numerical key 4.		"44444444"	Tone audible.
7. Press numerical key 5.		"55555555"	Tone audible.
8. Press numerical key 6.		"66666666"	Tone audible.
9. Press numerical key 7.		"77777777"	Tone audible.
10. Press numerical key 8.		"88888888"	Tone audible.
11. Press numerical key 9.		"99999999"	Tone audible.
12. Press * key.		"********"	Tone audible.
13. Press # key.	X	" "	Tone audible.
14. Press DTE key.		"DTE KEY "	
15. Press KDC key.		"KDC KEY "	
16. Press NET key.		"NET KEY "	
17. Press P key.		"TESTMODE"	Terminal back to test wait state.

5.7.8.2 <u>Switch Test Procedure</u>

In the switch test substate it is possible to test the hook switch, the Ptt switch and the SECURE push button.

Actions	LED	Display	Remarks
<u>Start conditions</u>: - Terminal on hook		"TESTMODE"	Terminal in test wait state.
1. Dial in test code 2.		"H1 P0 S0"	Terminal in switch test substate.
2. Go off hook.		"H0 P0 S0"	
3. Press Ptt switch.		"H0 P1 S0"	
4. Release Ptt switch.		"H0 P0 S0"	
5. Go on hook.		"H1 P0 S0"	
6. Press SECURE push button.		"H1 P0 S1"	
7. Release SECURE push button.		"H1 P0 S0"	
8. Press P key.		"TESTMODE"	Terminal back to test wait state.

5.7.8.3 Memory Test Procedure

In the memory test substate it is possible to test the data memory
black, the data memory red, the zeroise memory, program memory 1
(main EPROM) and program memory 2 (user EPROM).

Actions	LED	Display	Remarks
Start conditions: - Terminal on hook		"TESTMODE"	Terminal in test wait state.
1. Dial in test code 3.		"MEM TEST"	Terminal in memory test substate.
2. Press # key.		"MEM TEST"	The memory is tested.
		"MEM OK "	Memory ok.
If an error is detected, one of the following alarm indications appears in the display for 3 s:			
		"BLK RAM "	Data memory black faulty.
		"RED RAM "	Data memory red faulty.
		"ZER RAM "	Zeroise memory faulty.
		"M EPROM "	Main EPROM faulty.
		"U EPROM "	User EPROM faulty.

After the test, the terminal returns automatically to the test wait
state ("TESTMODE" is displayed).

5.7.8.4 <u>Modem Test Procedure</u>

In the modem test substate it is possible to test the modem. For
testing the internal modem the Low/High Frequency setting must be set
to LF and for testing an external modem to HF.

Actions	LED	Display	Remarks
<u>Start conditions</u>: - Terminal on hook		"TESTMODE"	Terminal in test wait state.
1. Dial in test code 4.		"MOD TEST"	Terminal in modem test substate.
2. Press # key.		"MOD TEST"	The modem is tested.
		"MODEM OK"	Modem ok.
If an error is detected, one of the following alarm indications appears in the display for 3 s:			
		"MODM ccc"	Modem control signal(s) faulty.
		"MDERR 01"	External loop test failed.
		"MDERR 02"	Internal loop test failed.
3. Press P key.		"TESTMODE"	Terminal back to test wait state.
ccc = 001, 002, 004, 008, 016, 032, 064 or 128			

5.7.8.5 Vocoder Test Procedure

In the vocoder test substate it is possible to test the vocoder.

Actions	LED	Display	Remarks
<u>Start conditions</u>: - Terminal on hook		"TESTMODE"	Terminal in test wait state.
1. Dial in test code 5.		"VOC TEST"	Terminal in vocoder test substate.
2. Go off hook.		"VOC TEST"	
3. Press # key.		"SPEAK ! "	The vocoder is looped.
4. Speak into the microphone.		"SPEAK ! "	The speech must be audible in the telephone.
5. Press P key.		"TESTMODE"	Terminal back to test wait state.

5.7.8.6 Timer Test Procedure

In the timer test substate it is possible to test timer short, timer long and the software timer.

Actions	LED	Display	Remarks
Start conditions: - Terminal on hook		"TESTMODE"	Terminal in test wait state.
1. Dial in test code 6.		"TIM TEST"	Terminal in timer test substate.
2. Press numerical key 1.		"TMSH xx"	Timer short is tested. It operates as a seconds counter.
3. Press numerical key 2.		"TMLO yy"	Timer long is tested.
4. Press numerical key 3.		"TMSW xx"	The software timer is tested. It operates as a seconds counter.
5. Press P key.		"TESTMODE"	Terminal back to test wait state.
xx = counter state (counter must run from 00 to 60 in 1 minute exactly). yy = counter state (counter must run from 00 to 60 in approx. 65 seconds).			

5.7.8.7 System Test Procedure

In the system test substate it is possible to test the system
completely. This test is possible only for the equipment type
UA 8251/00.

Actions	LED	Display	Remarks
Start conditions: - Terminal on hook		"TESTMODE"	Terminal in test wait state.
1. Set up a system test loop by inserting the loop-back connector into the line connector. See Note 1.		"TESTMODE"	
2. Dial in test code 7.		"VOC TEST"	Terminal in system test substate.
3. Go off hook.		"VOC TEST"	
4. Press # key.	X	"SPEAK ! "	The system is looped.
5. Speak into the microphone.	X	"SPEAK ! "	The speech must be audible in the telephone.
6. Press P key.		"TESTMODE"	Terminal back to test wait state.

Note 1: The loop-back connector connects pins 1-3 and 2-4 of the line
        connector (see Fig. 5.2). If the loop-back connector is not
        available, then a test loop can be established by connecting
        pins a-EB and b-GND of the telephone connector.

6   COMSEC INSTRUCTIONS

6.1   General

The comsec instructions are limited to:
- the loading of a Net variable;
- the loading of the KDC unique variable;
- the updating of a single Net variable;
- the updating of all Net variables simultaneously;
- the updating of the KDC unique variable;
- the zeroising of a single Net variable;
- the zeroising of a single KDC call variable;
- the zeroising of all Net variables simultaneously;
- the zeroising of all KDC call variables simultaneously.

A loading, update or zeroise procedure is possible only if the
terminal is on hook and a CIK module (with valid CIK) is connected.
The CIK module is tested automatically as soon as it is connected. If
its contents are valid, then "CIK OK " (terminal loaded) or
"NUL.CIK " (terminal empty and CIK=0) appears in the display for 3 s.
If the CIK is not valid, then "ILL.CIK " or "ERR.CIK " appears in the
display. In that case comsec operation will be possible only after a
general zeroise.

Each loading, update or zeroise procedure can be terminated or
interrupted by pressing the DTE key. Then the terminal returns to the
comsec wait state and "COMSEC ?" appears in the display. If the DTE
key is pressed during or after an update procedure without using a
key variable loading device, then the terminal will return to the
telephony on hook substate ("*   " in display again).

6.2   Key Variable Loading Procedures

A Net variable and the KDC unique variable can be loaded from a
loading device KYK-13 or a tape reader KOI-18.

6.2.1   Net Variable Loading Procedures

The compartment in which the Net variable is to be stored is selected by the dialling in of the number of that compartment (01...19, 00 for the emergency Net variable).

6.2.1.1   Loading Procedure Using the Loading Device KYK-13

Actions	LED	Display	Remarks
Start conditions: - Terminal on hook - CIK module connected		"* "	Terminal in telephony on hook substate.
1. Connect the loading device KYK-13 and set the MODE SELECT switch in the "ON" position.		"COMSEC ?"	Terminal in comsec wait state.
2. Select the appropriate Net variable by setting the MEMORY SELECT switch of the loading device in one of the positions 1...6.		"COMSEC ?"	
3. Press NET key.		"FILL XX?"	Terminal in fill substate.
4. Dial in compartment number (00...19).		"FILL AB " "ABFILLED" "AB FREE "	 Compartment already filled. Compartment empty.
5. Press P key.		"WAIT " "ABYYYY01"	The Net variable is being loaded. See Note 1. Loading action successful.
AB = compartment number (AB = 00...19) YYYY = control group (Y = A...P) 01 = update number			

Note 1: If the compartment was already filled, the contents will be overwritten.

6.2.1.2 Loading Procedure Using the Tape Reader KOI-18

Actions	LED	Display	Remarks
Start conditions: - Terminal on hook - CIK module connected		"* "	Terminal in telephony on hook substate.
1. Connect the tape reader KOI-18.		"COMSEC ?"	Terminal in comsec wait state.
2. Take a punched paper tape with a valid Net variable. Insert the end of the tape (with corners cut off) into the IN slot of the tape reader, with the drive-sprocket holes aligned with the white dots on the tape guide. Pull the tape through the tape reader up to the beginning of the key variable holes.		"COMSEC ?"	
3. Press NET key.		"FILL XX?"	Terminal in fill substate.
4. Dial in compartment number (00...19).		"FILL AB " "ABFILLED" "AB FREE "	Compartment already filled. Compartment empty.
5. Press P key.		"WAIT "	
6. Pull the tape through the tape reader at a slow and constant speed.		"WAIT " "ABYYYY01"	The Net variable is being loaded. See Note 1. Loading action successful.
AB = compartment number (AB = 00...19) YYYY = control group (Y = A...P) 01 = update number			

Note 1: If the compartment was already filled, the contents will be overwritten.

6.2.2 KDC Unique Variable Loading Procedures

The compartment in which the KDC unique variable is to be stored is selected by the dialling in code 97.

6.2.2.1 Loading Procedure Using the Loading Device KYK-13

Actions	LED	Display	Remarks
Start conditions: - Terminal on hook - CIK module connected		"* "	Terminal in telephony on hook substate.
1. Connect the loading device KYK-13 and set the MODE SELECT switch in the "ON" position.		"COMSEC ?"	Terminal in comsec wait state.
2. Select the KDC unique variable by setting the MEMORY SELECT switch of the loading device in one of the positions 1...6.		"COMSEC ?"	
3. Press NET key.		"FILL XX?"	Terminal in fill substate.
4. Dial in code 97.		"FILL 97 " "F UNIQUE"	
5. Press P key.		"WAIT " "97----01"	The KDC unique variable is being loaded. See Note 1. Loading action successful. See Note 2.
01 = update number			

Note 1: If the compartment was already filled, the contents will be overwritten.

Note 2: During loading of the KDC unique variable, all KDC call variables are zeroised.

6.2.2.2 <u>Loading Procedure Using the Tape Reader KOI-18</u>

Actions	LED	Display	Remarks
<u>Start conditions</u>: - Terminal on hook - CIK module connected		"* "	Terminal in telephony on hook substate.
1. Connect the tape reader KOI-18.		"COMSEC ?"	Terminal in comsec wait state.
2. Take a punched paper tape with a valid KDC unique variable. Insert the end of the tape (with corners cut off) into the IN slot of the tape reader, with the drive-sprocket holes aligned with the white dots on the tape guide. Pull the tape through the tape reader up to the beginning of the key variable holes.		"COMSEC ?"	
3. Press NET key.		"FILL XX?"	Terminal in fill substate.
4. Dial in code 97.		"FILL 97 " "F UNIQUE"	
5. Press P key.		"WAIT "	
6. Pull the tape through the tape reader at a slow and constant speed.		"WAIT " "97----01"	The KDC unique variable is being loaded. See Note 1. Loading action successful. See Note 2.
01 = update number			

Note 1: If the compartment was already filled, the contents will be overwritten.
Note 2: During loading of the KDC unique variable, all KDC call variables are zeroised.

6.3 Key Variable Update Procedures

Updating of key variables is possible for:
- a single Net variable
- all Net variables simultaneously
- the KDC unique variable

6.3.1 Single Net Variable Update Procedures

The selecting of a single Net variable takes place on dialling in the compartment number under which the key variable is stored.
Furthermore the possibility is provided of putting in also the number of update steps by dialling in the desired update number.

6.3.1.1 Update Procedure Without Using a Key Variable Loading Device

Actions	LED	Display	Remarks
Start conditions: - Terminal on hook - CIK module connected		"* "	Terminal in telephony on hook substate.
1. Dial in code 24111.		"* "	The digits do not become visible.
2. Press * key.		"UPD XX? "	Terminal in update substate.
3. Dial in compartment number (00...19).		"UPD AB " "U AB.ZZ "	
4. Dial in the new update number, unless one update step is required.		"U AB.FF " "AB ZZ-FF"	
5. Press P key.		"ABYYYYFF"	Update action successful. See Note 1.
AB = compartment number (AB = 00...19) FF = new update number YYYY = control group (Y = A...P) ZZ = previous update number (ZZ = 01...99)			

Note 1: After the update action the terminal remains in the update substate. Another compartment can now be selected by dialling in a new compartment number immediately.

6.3.1.2   Update Procedure Using a Key Variable Loading Device

Actions	LED	Display	Remarks
Start conditions: - Terminal on hook - CIK module connected		"* "	Terminal in telephony on hook substate.
1. Connect the loading device KYK-13 and set the MODE SELECT switch in the "ON" position, connect the tape reader KOI-18, or connect a dummy fill-gun.		"COMSEC ?"	Terminal in comsec wait state.
2. Press * key.		"UPD XX? "	Terminal in update substate.
3. Dial in compartment number (00...19).		"UPD AB " "U AB.ZZ "	
4. Dial in the new update number, unless one update step is required.		"U AB.FF " "AB ZZ-FF"	
5. Press P key.		"ABYYYYFF"	Update action successful. See Note 1.
AB = compartment number (AB = 00...19) FF = new update number YYYY = control group (Y = A...P) ZZ = previous update number (ZZ = 01...99)			

Note 1: After the update action the terminal returns to the comsec wait state. Another compartment can now be selected by pressing the * key again followed by a new compartment number.

6.3.2   All Net Variables Update Procedures

All Net variables, with the exception of the emergency Net variable,
can be updated simultaneously by dialling in of code 96. There will
be one update step per key variable.

6.3.2.1   Update Procedure Without Using a Key Variable Loading Device

Actions	LED	Display	Remarks
Start conditions: - Terminal on hook - CIK module connected		"* "	Terminal in telephony on hook substate.
1. Dial in code 24111.		"* "	The digits do not become visible.
2. Press * key.		"UPD XX? "	Terminal in update substate.
3. Dial in code 96.		"UPD 96 " "U 96.-- "	
4. Press P key.		"96.-----"	Update action successful.

6.3.2.2 Update Procedure Using a Key Variable Loading Device

Actions	LED	Display	Remarks
Start conditions: - Terminal on hook - CIK module connected		"* "	Terminal in telephony on hook substate.
1. Connect the loading device KYK-13 and set the MODE SELECT switch in the "ON" position, connect the tape reader KOI-18, or connect a dummy fill-gun.		"COMSEC ?"	Terminal in comsec wait state.
2. Press * key.		"UPD XX? "	Terminal in update substate.
3. Dial in code 96.		"UPD 96 " "U 96.-- "	
4. Press P key.		"96.-----"	Update action successful.

6.3.3   KDC Unique Variable Update Procedures

The selecting of the KDC unique variable takes place on dialling in code 97.

6.3.3.1 Update Procedure Without Using a Key Variable Loading Device

Actions	LED	Display	Remarks
Start conditions: - Terminal on hook - CIK module connected		"* "	Terminal in telephony on hook substate.
1. Dial in code 24111.		"* "	The digits do not become visible.
2. Press * key.		"UPD XX? "	Terminal in update substate.
3. Dial in code 97.		"UPD 97 " "U 97.ZZ "	
4. Press P key.		"97----FF"	Update action successful. See Note 1.
FF = new update number ZZ = previous update number (ZZ = 01...99)			

Note 1: During updating of the KDC unique variable, all KDC call variables are zeroised.

6.3.3.2 Update Procedure Using a Key Variable Loading Device

Actions	LED	Display	Remarks
Start conditions: - Terminal on hook - CIK module connected		"* "	Terminal in telephony on hook substate.
1. Connect the loading device KYK-13 and set the MODE SELECT switch in the "ON" position, connect the tape reader KOI-18, or connect a dummy fill-gun.		"COMSEC ?"	Terminal in comsec wait state.
2. Press * key.		"UPD XX? "	Terminal in update substate.
3. Dial in code 97.		"UPD 97 " "U 97.ZZ "	
4. Press P key.		"97----FF"	Update action successful. See Note 1.
FF = new update number ZZ = previous update number (ZZ = 01...99)			

Note 1: During updating of the KDC unique variable, all KDC call variables are zeroised.

6.4   Key Variable Zeroise Procedure

Zeroising of key variables is possible for:
- a single Net variable
- a single KDC call variable
- all Net variables simultaneously
- all KDC call variables simultaneously

The selecting of a single KDC call variable or a single Net variable
takes place on dialling in of the compartment number under which the
key variable is stored in the memory.
The zeroising of all Net variables, excepting the emergency Net
variable, is possible by selection of code 91. The zeroising of all
KDC call variables by selection of code 72.

Actions	LED	Display	Remarks
Start conditions: - Terminal on hook - CIK module connected		"* "	Terminal in telephony on hook substate.
1. Connect the loading device KYK-13 and set the MODE SELECT switch in the "ON" position, connect the tape reader KOI-18, or connect a dummy fill-gun.		"COMSEC ?"	Terminal in comsec wait state.
2. Press # key.		"Z XX ? "	Terminal in zeroise substate.
3. Dial in compartment number or code.		"Z AB ? "	
4. Press P key.		"AB.00000"	Zeroise action successful.
AB = compartment number or code			

7   ERROR INDICATIONS

7.1   Under{General}

This chapter summarises the possible error indications and their
meanings. The indications will remain in the display until a
correcting procedure is performed.

7.2   Miscellaneous Errors

Display	Meaning
"ERR.CIK "	Activity/parity check on CIK failed
"ERR IZK "	Encryption/decryption of key variable failed
"ERR KEY "	Activity/parity check on key variable failed
"ILL.CIK "	CIK not valid (belongs not to the terminal)
"ILL CODE"	Illegal code selected
"ILL COMP"	Illegal compartment selected
"NO CIK "	CIK module not connected
"NO KEY "	Selected compartment contains no key variable
"NOCRYPTO"	No crypto functions available due to key generator failures detected during the self-test
"NUL.CIK "	Terminal empty and CIK = 0

7.3   Key Variable Loading Errors

Display	Meaning
"CIK FAIL"	New CIK cannot be written to the CIK module
"F ERR 01"	Fill-gun interface problem
"F ERR 11"	Activity/parity check on key variable failed
"F ERR 12"	Key variable store error
"F ERR 21"	Generation of new CIK or new IZK failed

7.4   Key Variable Update Errors

Display	Meaning
"-EMPTY- "	Terminal empty
"AB ALARM"	Activity/parity check on updated Net variable failed (AB = compartment number (01...19))
"ALARM "	Activity/parity check on updated key variable failed
"U ERR 50"	Activity/parity check on key variable failed
"U ERR 51"	Decryption or storage of key variable failed
"UABERR50"	Activity/parity check on Net variable failed (AB = compartment number (01...19))
"UABERR51"	Decryption or storage of Net variable failed (AB = compartment number (01...19))

7.5   Key Variable Zeroise Errors

Display	Meaning
"-EMPTY- "	Terminal empty
"Z ERR 61"	Zeroise action failed

8   ALARM INDICATIONS

8.1   General

         This chapter summarises the alarm indications and their meanings. A
         distinction is made between hard and soft alarms. Hard alarms lead to
         an unconditional transition to the alarm state, soft alarms leading
         merely to a report in the display. During the self-test all alarms,
         except the fatal hardware alarms are treated as soft.

8.2   Alarms During Self-test

         If during the self-test an error is detected, an alarm report
         depending on the cause will appear in the display. If a fatal
         hardware alarm is concerned, then furthermore the LED will start
         flashing and an alarm signal becomes audible.

Display	Meaning
"%ACTV -c"	Activity alarm could not be set (c = 1, 2 or 4)
"%BLK RAM"	Black RAM malfunction (fatal alarm)
"%COMAL -"	Compare alarm could not be set
"%CRYP AL"	Crypto alarm could not be reset
"%INT abc"	Interrupt could not be reset (fatal alarm) (abc = --1, --2, --4, -1-, -2-, -4-, 1--, 2-- or 4--)
"%INT x"	Interrupt could not be reset (fatal alarm) (x = 1 or 2)
"%KGR "	RKG could not be switched to firmware clock
"%KGR c"	Bit pattern alarm RKG (c = 1, 2 or 4)
"%KGT "	PKG/CKG could not be switched to firmware clock
"%KGT c"	Bit pattern alarm PKG/CKG (c = 1, 2 or 4)
"%LOOP 1"	Internal (digital) test loop failed
"%LOOP 3"	External (analogue) test loop failed
"%LOOT -c"	Random bit alarm could not be set/reset (c = 1, 2 or 4)
"%M EPROM"	Main EPROM faulty (fatal alarm)

Alarms during self-test (continued)

Display	Meaning
"%MODEM "	Modem control signal(s) faulty or Low/High Frequency setting incorrect
"%RED RAM"	Red RAM malfunction (fatal alarm)
"%TIBASE "	Time base alarm (fatal alarm)
"%TMLONG "	Timer long malfunction (fatal alarm)
"%TMSHRT "	Timer short malfunction (fatal alarm)
"%U EPROM"	User EPROM faulty (fatal alarm)
"%ZER RAM"	Zeroise RAM malfunction

8.3   Hard Alarms

Hard alarms result in an unconditional transition to the alarm state. These alarms can be reset only by going off/on hook.

Display	Meaning
"%ACTV c"	Activity alarm (c = 1, 2 or 4)
"%ALARM "	Fill-gun disconnected, CIK module disconnected or zeroise alarm. In case of zeroise alarm, "ZEROISED" appears in the display a little later.
"%COMAL c"	Compare alarm (c = 1, 2 or 4)
"%KGR "	RKG could not be switched to firmware clock
"%KGT "	PKG/CKG could not be switched to firmware clock
"%LOOT c"	Random bit alarm (c = 1, 2 or 4)
"%MODEM "	Modem control signal(s) faulty
"%OPSYS "	Operating system error

8.4   Soft Alarms

Soft alarms result only in a report in the display.

Display	Meaning
"%RECV "	Receive buffer overflow
"%UNDEF "	Undefined alarm
"%VOCOM "	Vocoder handshake failed
"%XMIT "	Transmit buffer underflow