EF SOFTWARE FIELD PROGRAMMER

USER MANUAL

INDEX

SRN: 17086-1

SECTION 1

INTRODUCTION

1. INTRODUCTION

The Stornophone 6000 Personality Program for software package EF is a software tool for field programming.

The program package consists of one 5 1/4" disk with the files:

EF	.BAT
EFR5S	.EXE
HELP	.DAT
DATA I0	.EXE
DATAXFER	.EXE

All files must be present on the disk or installed in the same hard disk directory when the program is executed.

1.1. HARDWARE AND SOFTWARE REQUIREMENTS

a) IBM compatible PC-XT.

b) One 5 1/4" floppy disk drive for double sided/double density disks, two are recommended.

c) 640 KB of memory.

d) 80 column monitor, colour or monochrome.

e) Asynchroneous Communication adapter configured as COM1.

f) Disk Operating system, DOS 2.11 or higher.

g) Programmer (Data I/O 19/22 or PATSI).

h) RS232 interface cable.

1.1.1. OPTIONAL HARDWARE

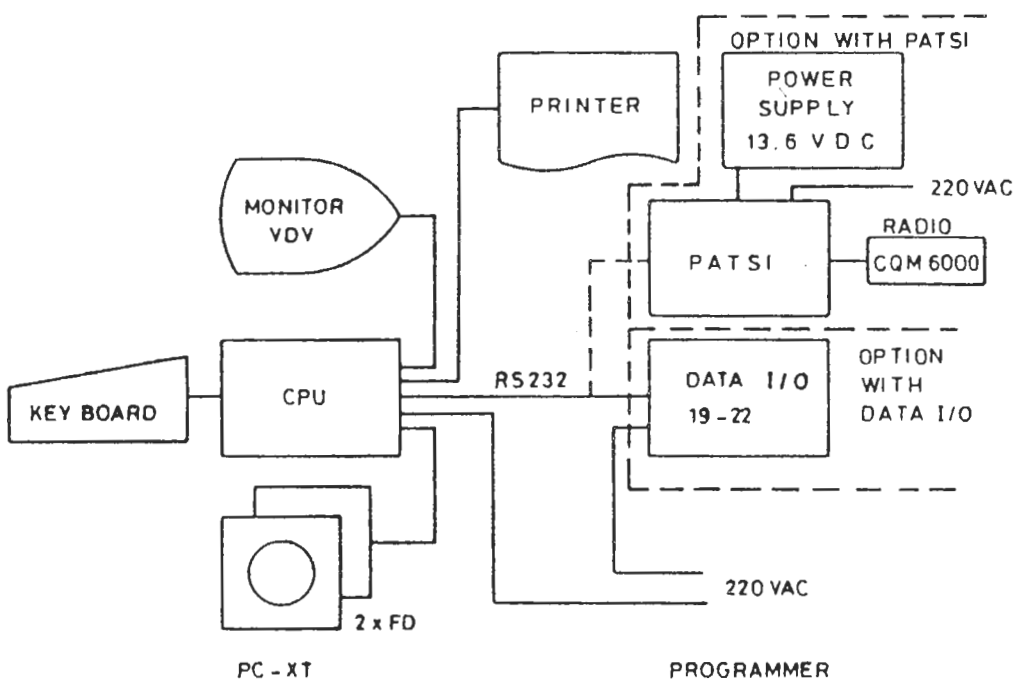
Printer with parallel centronics interface and appropiate cable.

DATA I/O 19 or 22 for programming of Eproms.

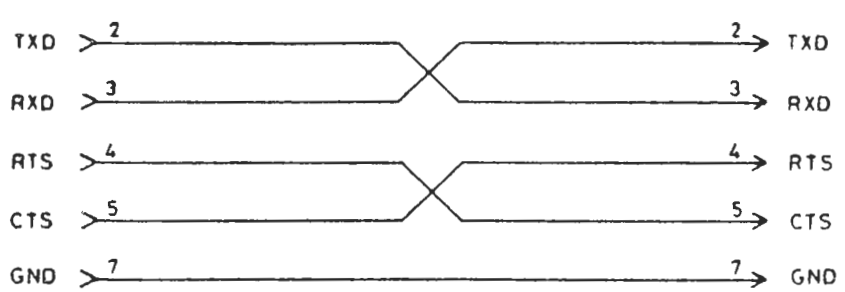
PATSI version 2 part no. 95D5010-00

PATSI version 3 part no. 95D5013-00

1.2. HARDWARE SET UP



RS 232 CABLE



D405.009

The communication adaptor on the back of the CPU must be connected to the RS232 connector on the back of the programmer or PATSI using the RS232 cable.
Both the computer and the programmer are connected to 220 V AC.

1.3. SOFTWARE INSTALLATION

Before using the Stornophone 6000 Personality program, copy the files on the original disk to a work disk. To do this insert your DOS disk in drive A: and turn the computer on.
When the prompt symbol A> is displayed type the DISKCOPY A: B: <CR> command to make a work disk and when prompted insert your original Stornophone 6000 disk in drive A: as your source disk and a blank disk in drive B: as your destination disk. The system will automatically format the work disk while copying the files.
When the copy is ready label it properly and store your original master disk in a safe place.

Insert your work disk in drive A: and make sure that you are locked on to drive A.
You should see the A> prompt; if not type A: <CR> and when the A> prompt is displayed type: EF <CR> and the program is loaded and executed.

SECTION 2

EF SOFTWARE SPECIFICATION

2. EF SOFTWARE SPECIFICATION

2.1. GENERAL

The Stornophone 6000 software consists of a main program stored in a Read Only Memory (ROM) and Personality data stored in a Personality ROM which may be either a Programmable Read Only Memory (PROM) or an Electrically Erasable PROM (EEPROM)

The address range of the complete memory is 0000_H - $CFFF_H$ and the personality data are located in the area $C000_H$ - $C7FF_H$.

2.2. PERSONALITY PROM STRUCTURE

In order to arrange the personality data in a logically form the personality PROM (2KB) is divided into 8 pages of 256 bytes and each page used to store different kinds of data.

Page 0	is used for Radio environment data, general data and pointers.
Page 1-4	are used for channel data and synthesizer frequency codes.
Page 5	is used for tone signalling telegrams.
Page 6	is used for tone telegram lists.
Page 7	is used for action descripters, tables and miscellaneous data.

2.3. PERSONALITY DATA

The data describing the personality of a radio is called the software nomenclature and consists of mnemonics which may be either functions or subfunctions.

A function is a mnemonic which states that a specific software function is wanted and some of these functions may, if selected, be further described in details by one or more subfunctions.

2.3.1. DEFAULT PERSONALITY DATA

All functions and subfunctions, except for channel frequencies have been given a default value which are automatically selected by the program unless the computer operator enters a different option.

2.3.2. PERSONALITY DATA STORAGE

Personality proms calculated by the PC-XT personality program may be saved on a disk and later loaded again. The data set may then be altered to create a new personality prom which can be saved and hence build a library of personality data.

2.4. PERSONALITY PROGRAM STRUCTURE

The Stornophone 6000 EF personality program is divided into screen pages and menus. The SETUP page is used to give general information of time and computer environment.

2.4.1.2.4.1. THE MAIN MENU

The main menu lists the options of programming facilities.

(E)nter data is used to create a completely new personality prom either using default data or data loaded from a file in the library.

(D)isk I/O is used to perform data saving or loading.

(C)ode plug is the programming routines provided for code plugs.

(S)et up returns to the setup page.

(T)ransfer is used to invoke the routines for data transfer to the programming equipment.

(Q)uit exits the EF personality program.

2.4.2. COMMENTS PAGE

The comments page may be used to include information about the personality prom, f.ex. customer, radio system, operator or any other comments. These text lines are stored in the order data file and later used to identify the job.

2.4.3. GENERAL PAGE

The general page is used to input the radio type and the type of control box. This information defines the radio hardware and the structured options which may be found on the type label. The page also requests input of software nomenclature describing how the hardware should look like to the operator, f.ex. display configuration, timers and acoustical signals, volume levels and input/output lines.

2.4.4. CHANNEL PAGE

The channel page is used to input frequencies for each channel and other channel related options.

A maximum of 99 channels may be specified and when one screen is full the program automatically advances to a new screen. Channels may be entered in any order and need not be sorted.

2.4.5. SYSTEM PERSONALITY SETUP PAGES

A Stornophone 6000 radio may contain up to 4 system personality setups (SPS =) and for each used the corresponding 3 pages must be filled. The first of the SPS pages is used to define the general tone signalling concept for the setup, the second page defines all encoder telegrams and their related functions, and the third SPS page defines all tone decoder telegrams.

2.5. DATA SAVING

When the personality data are ready they may be saved on the disk using the path as entered on the setup page. The complete software nomenclature may be saved as order dat and the operator is requested to input a file name. The program automatically appends the extension .dta.
The program then calculates the prom data and the prom data may be saved. The operator is requested to input a file name (default = temp) and the program automatically appends the extension .OBJ. This file may later be accessed by the data transfer routines.

2.6. DISK IN/OUT

The disk in/out routines proprises:

(R)ead order data file
(W)rite order data file
(G)et prom data file
(P)ut prom data file

Each routine requires input of the file name to be read or written.

2.7. LISTINGS

The program provides a selection of listings, either on the screen or on a printer connected to the computer's printer port.
The operator has the option to list both the order data (software nomenclature) and the contents of the personality prom (prom data).

2.8. CODE PLUG PROGRAMMING

The code plug options allow the operator to enter the code plug nomenclature and the program then calculates the contents of the code plug. These data may then be used as input to the code plug programming facility in Patsi 3.

2.9. SETUP

The setup options in the main menu resets the program and restarts the execution at the setup page.

2.10. TRANSFER

The transfer option invokes the data transfer routines to send a data file to the programming equipment which may be either a EPROM programmer or a Patsi.

2.11. HELP

The F1 button has been programmed to display a short help notice when the cursor is positioned in an input field. The help notice gives a short explanation of the valid options relative to the nomenclature.

SECTION 3

EF SOFTWARE NOMENCLATURE

3. EF SOFTWARE NOMENCLATURE

This section describes the radio software nomenclature and the code plug nomenclature.

The radio software nomenclature comprises 12 pages as follows:

3.1. General specifications

3.2. Channel specifications

3.3. System personality set-up

3.4. Code Plug

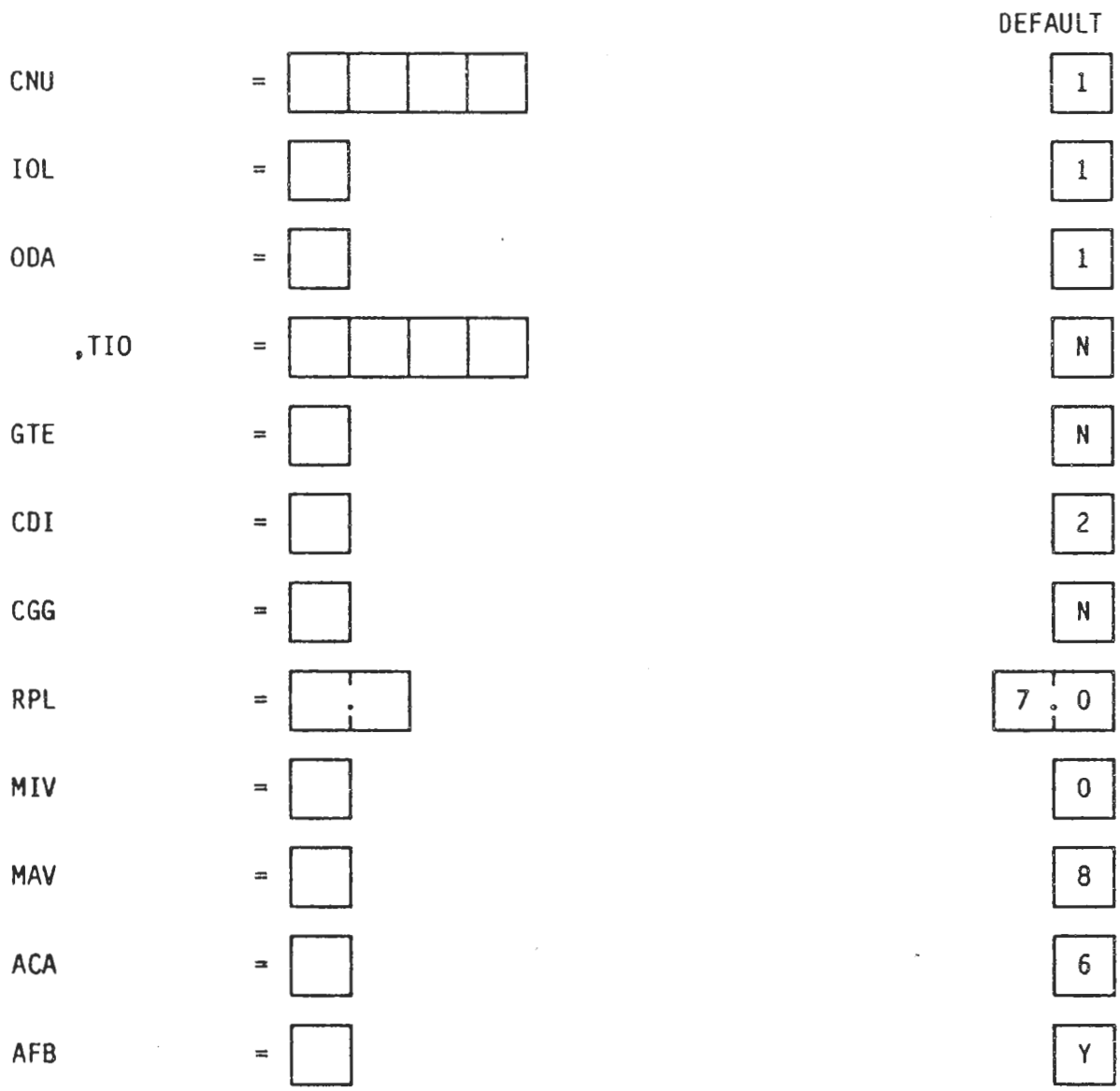
The general specifications must always be defined.

The channel specifications need to be defined for each channel in the radio and may hence be repeated up to 99 times.

The system personality set-up must be defined for each SPS used in the radio. At least 1 SPS must be defined.

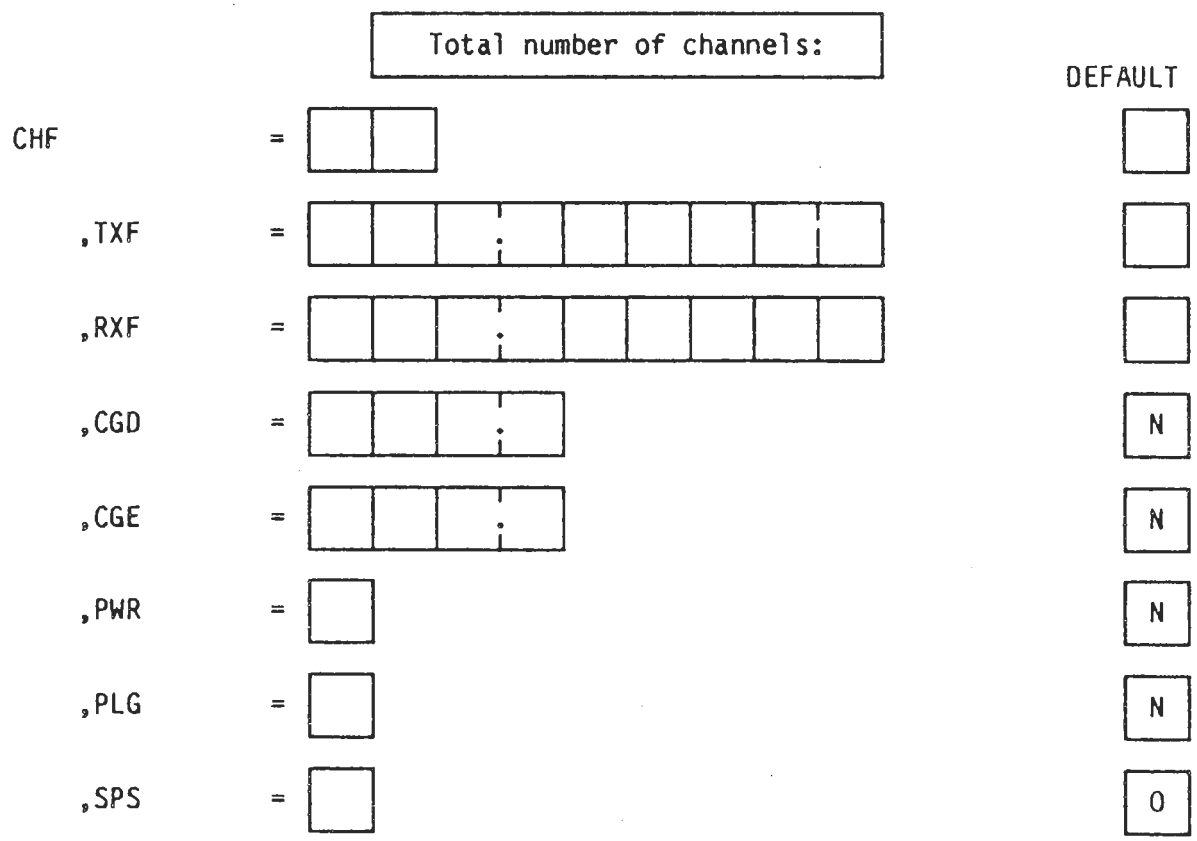
The EF personality program automatically keeps track of how many system personality set-ups you have assigned to the channels and request the appropriate inputs. Optional you may define additional set-ups as long as they can be contained in the personality prom.

3.1. GENERAL SPECIFICATIONS



3.2. CHANNEL SPECIFICATIONS

This page must be filled for each channel



3.3. SYSTEM PERSONALITY SET-UP

The system Personality Set-up must be defined for each SPS.

The accumulated number of telegrams (encoders and decoders) in all SPS must not excee

Sequential tone systems:	28
Binary according to ZVEI:	25
Binary according to EEA:	18
If sequential and binary mixed:	See section 10

Total number of SPS: Accumulated number of telegrams in all SPS:

		DEFAULT
SPS	=	0
ADI	=	0
SDI	=	0
PRI	=	N
,BDT	=	1 0
,MAT	=	Y
,MAC	=	N
PTA	=	0
TKA	=	0
SKA	=	0

3.3.1. NUMBER OF TELEGRAMS WHEN MIXING TONE SYSTEMS:

3.3.1.1. BZV to Sequential

Number of telegrams according to BZV:	Then number of sequential telegrams:
0	28
1	27
2	26
3	25
4	24
5	22
6	21
7	20
8	19
9	18
10	17
11	16
12	15
13	14
14	12
15	11
16	10
17	9
18	8
19	7
20	6
21	5
22	4
23	2
24	1
25	0

The EF personality program checks the number of bytes used to define telegrams and if exceeding the limit an error message is displayed.

3.3.1.2. Sequential to BZV

Number of sequential telegrams:	Then number of telegrams according to BZV
0	25
1	24
2	23
3	22
4	22
5	21
6	20
7	19
8	18
9	17
10	16
11	15
12	14
13	13
14	13
15	12
16	11
17	10
18	9
19	8
20	7
21	6
22	5
23	4
24	4
25	3
26	2
27	1
28	0

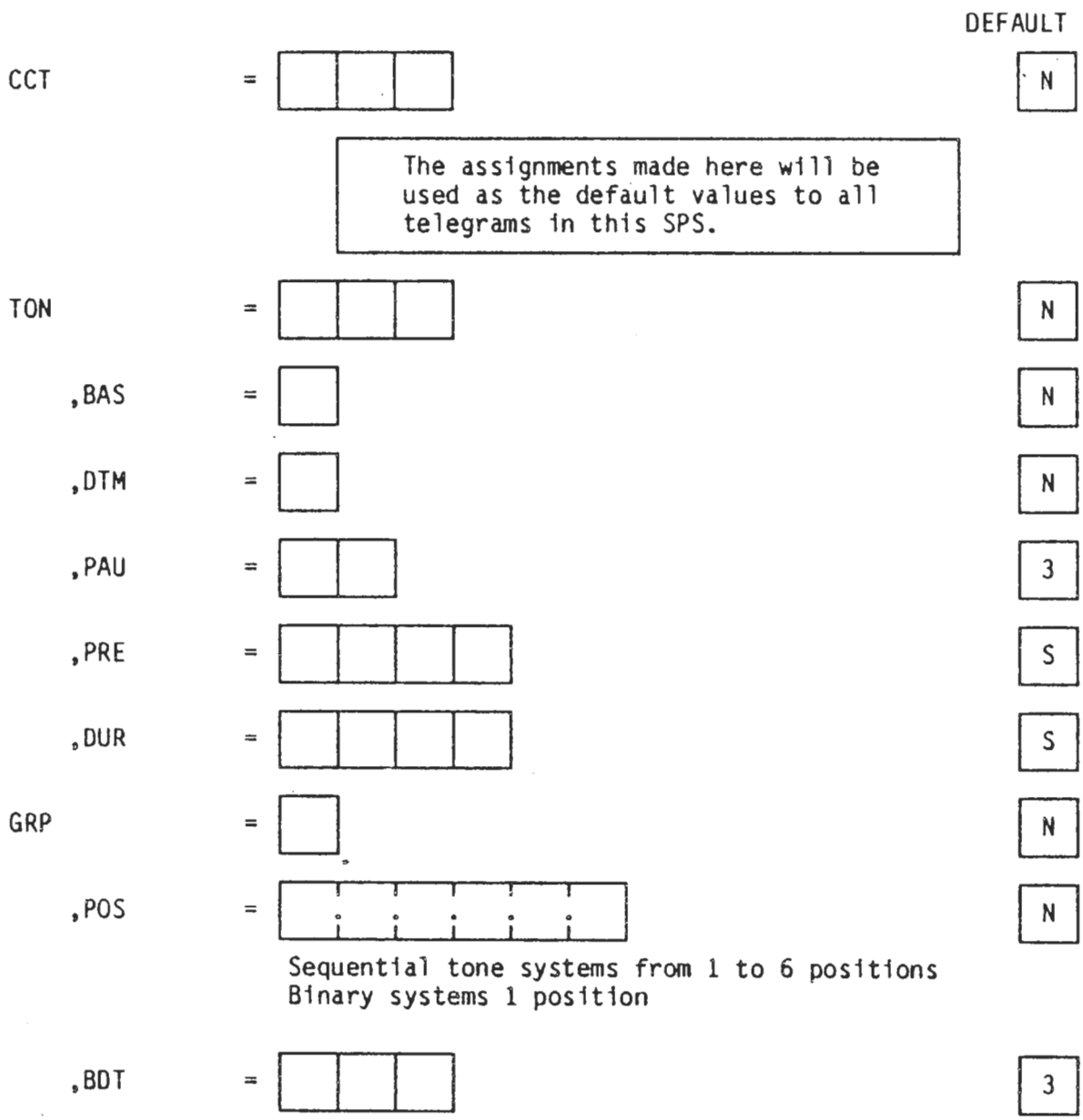
3.3.1.3. BEE to Sequential

Number of telegrams according to BEE:	Then number of sequential telegrams:
0	28
1	26
2	25
3	23
4	22
5	20
6	19
7	17
8	16
9	14
10	12
11	11
12	9
13	8
14	6
15	5
16	3
17	2
18	0

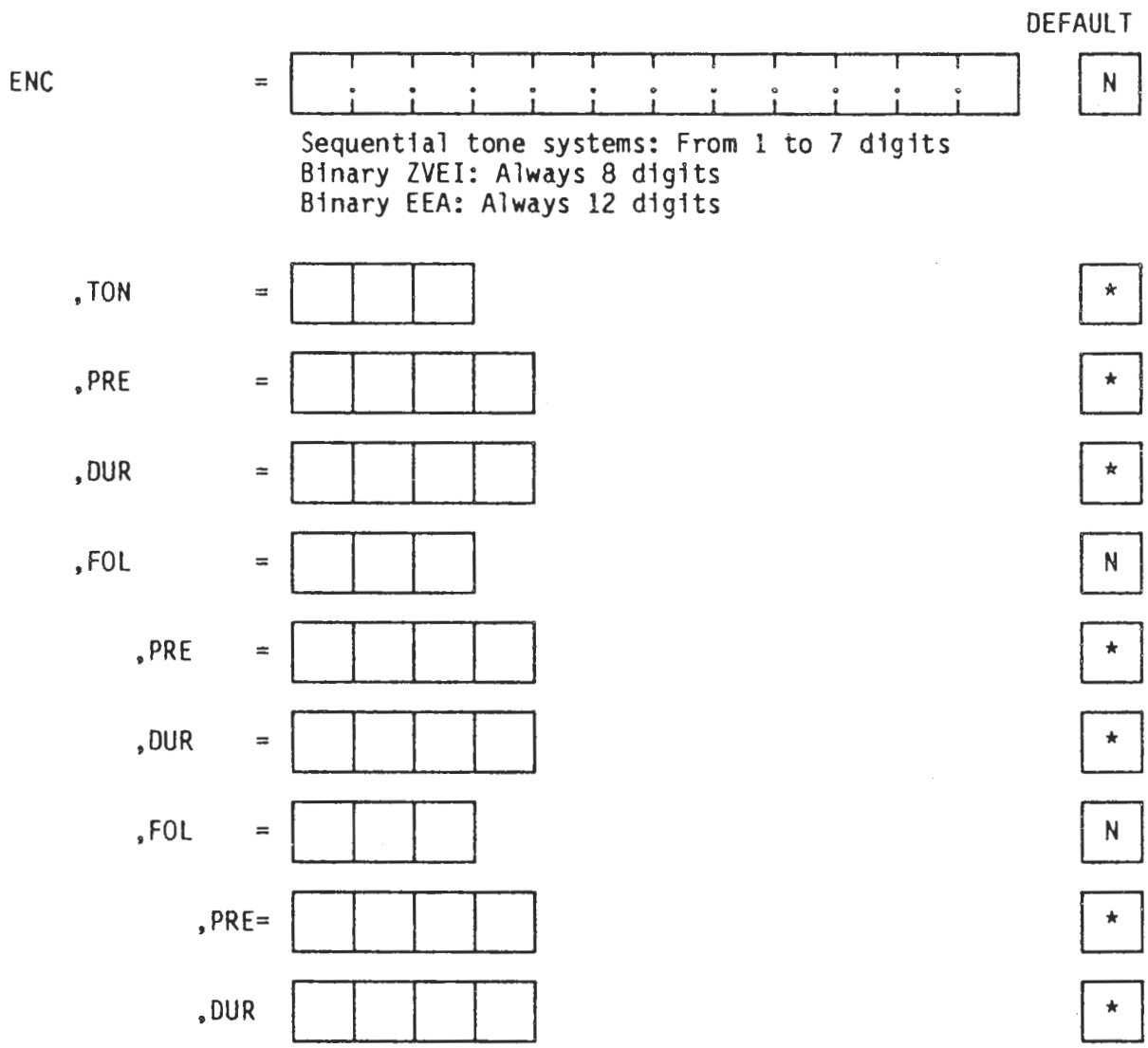
3.3.1.4. Sequential to BEE

Number of sequential telegrams:	Then number of telegrams according to BEE
0	18
1	17
2	17
3	16
4	15
5	15
6	14
7	13
8	13
9	12
10	11
11	11
12	10
13	9
14	9
15	8
16	8
17	7
18	6
19	6
20	5
21	4
22	4
23	3
24	2
25	2
26	1
27	0
28	0

3.3.2. GENERAL TONE SYSTEM

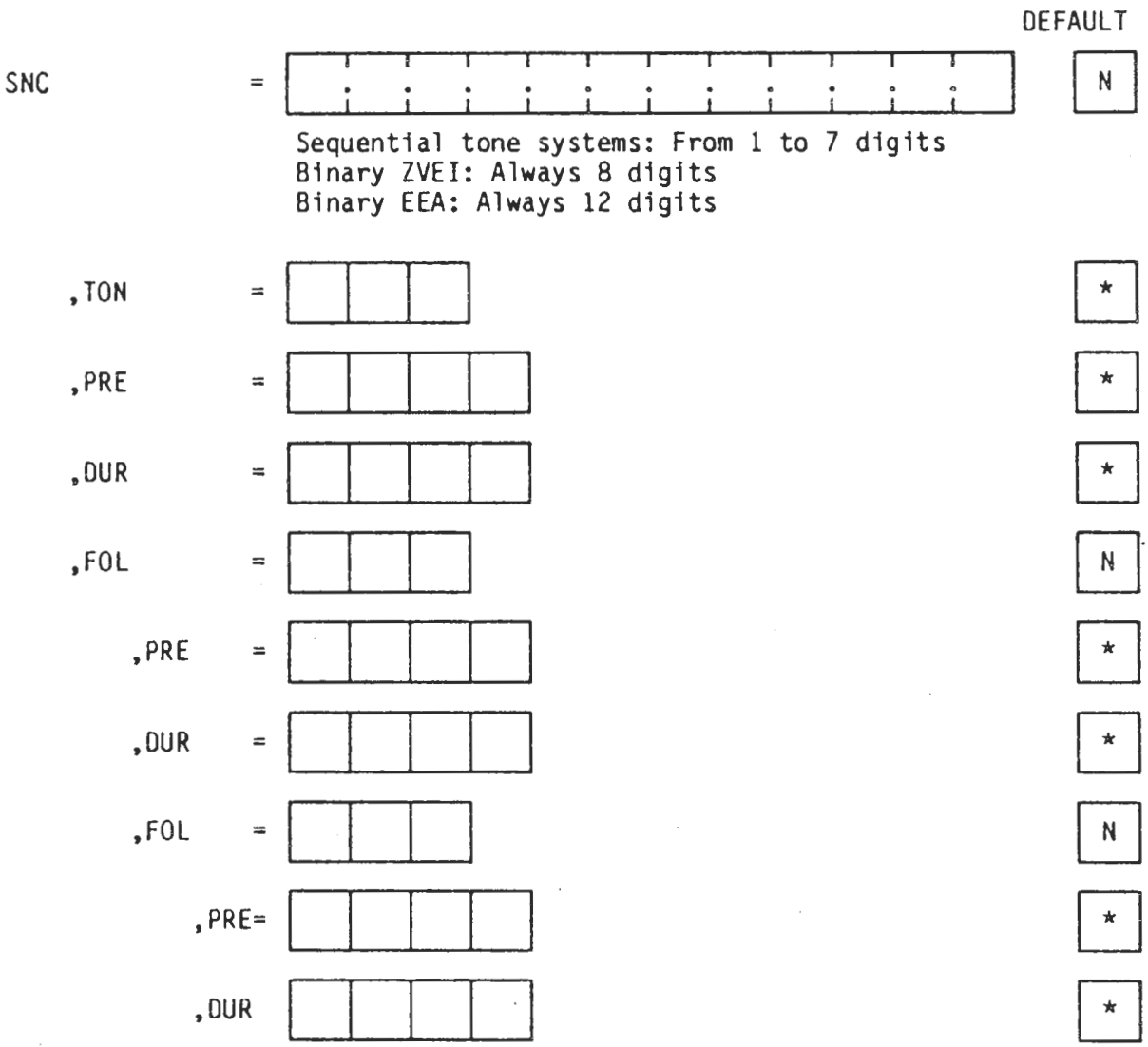


3.3.3. ENCODER



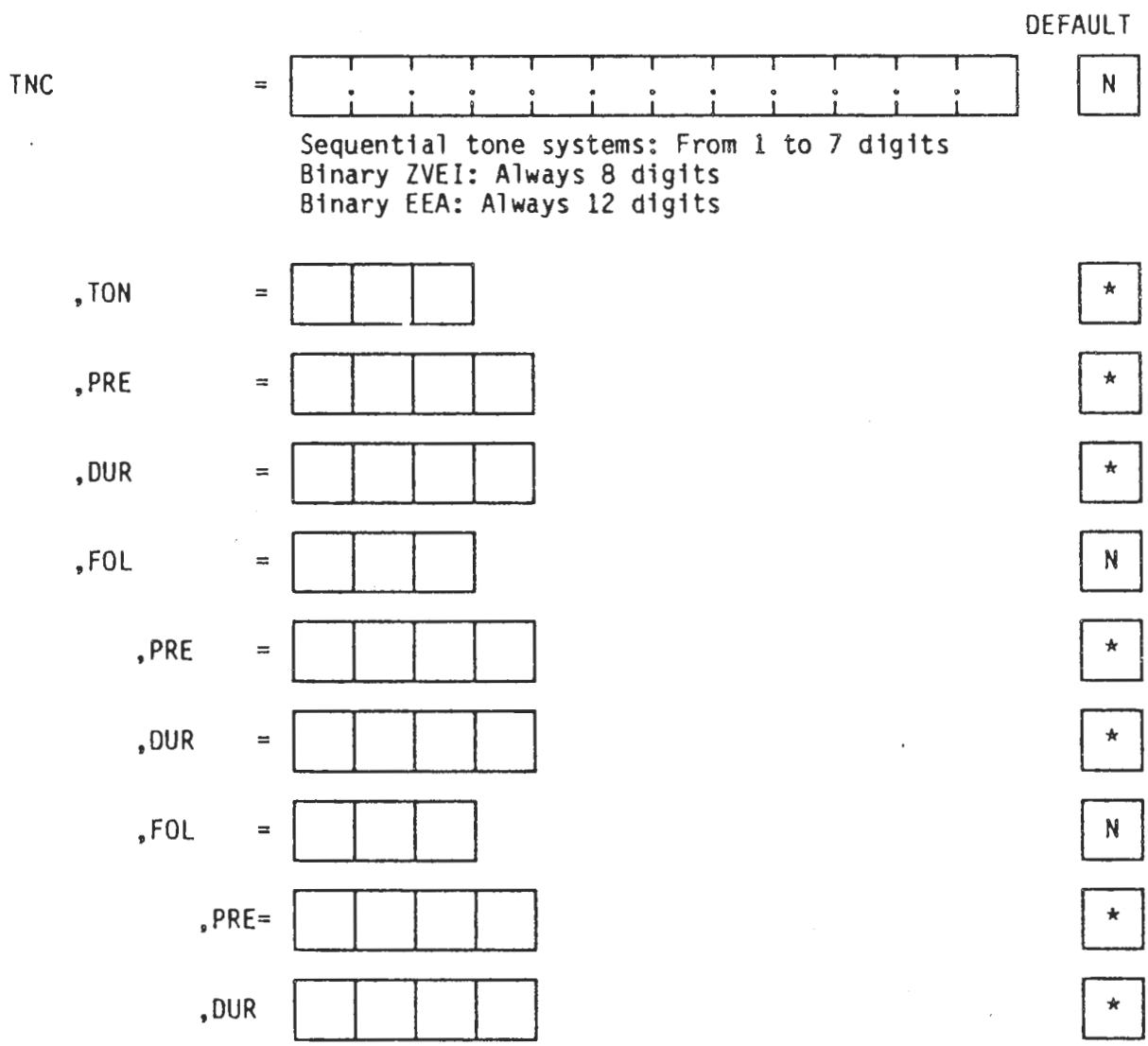
* = Value as assigned to the corresponding main function TON= and its subfunctions

3.3.4. SECOND ENCODER



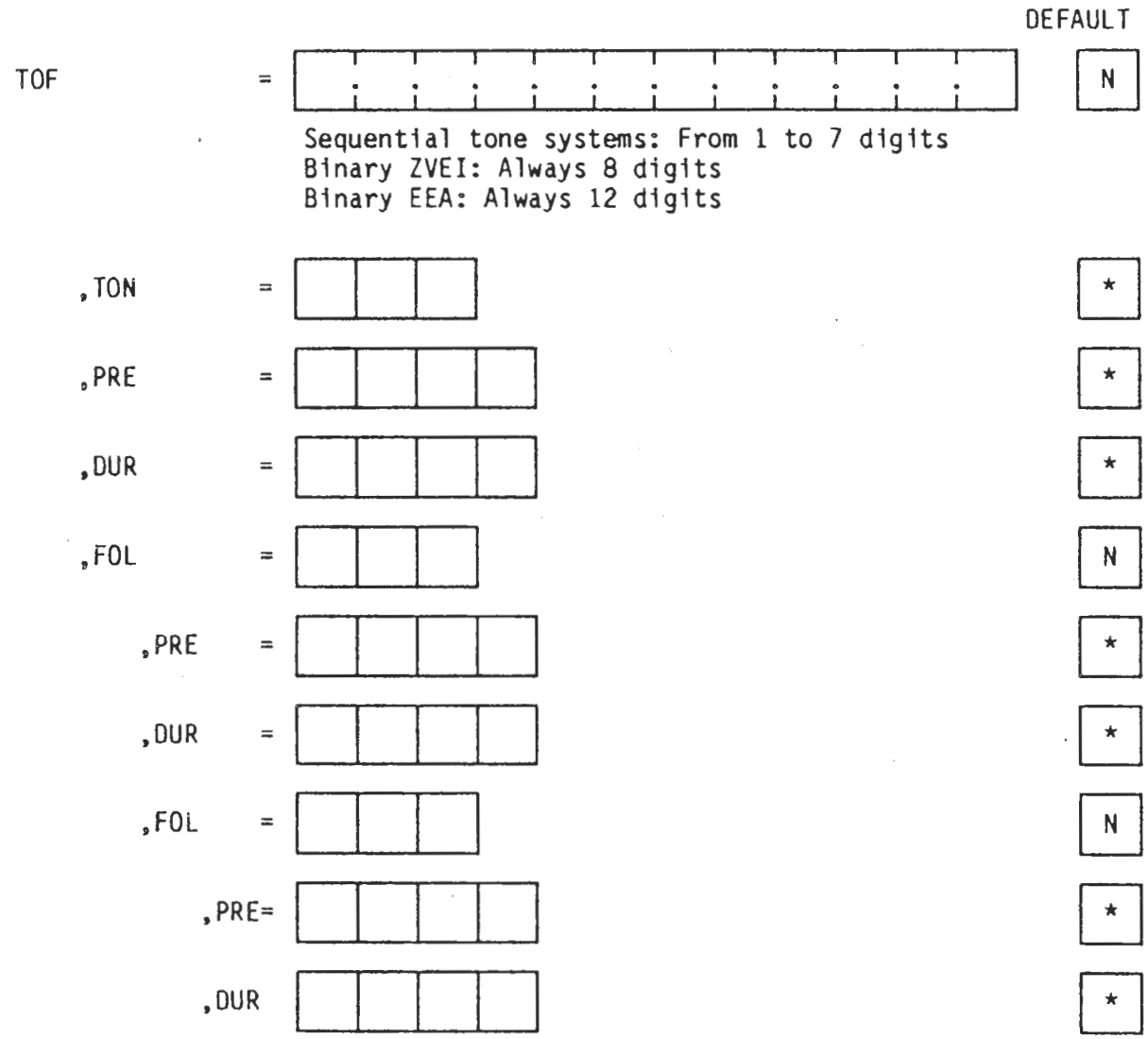
* = Value as assigned to the corresponding main function TON= and its subfunctions.

3.3.5. THIRD ENCODER



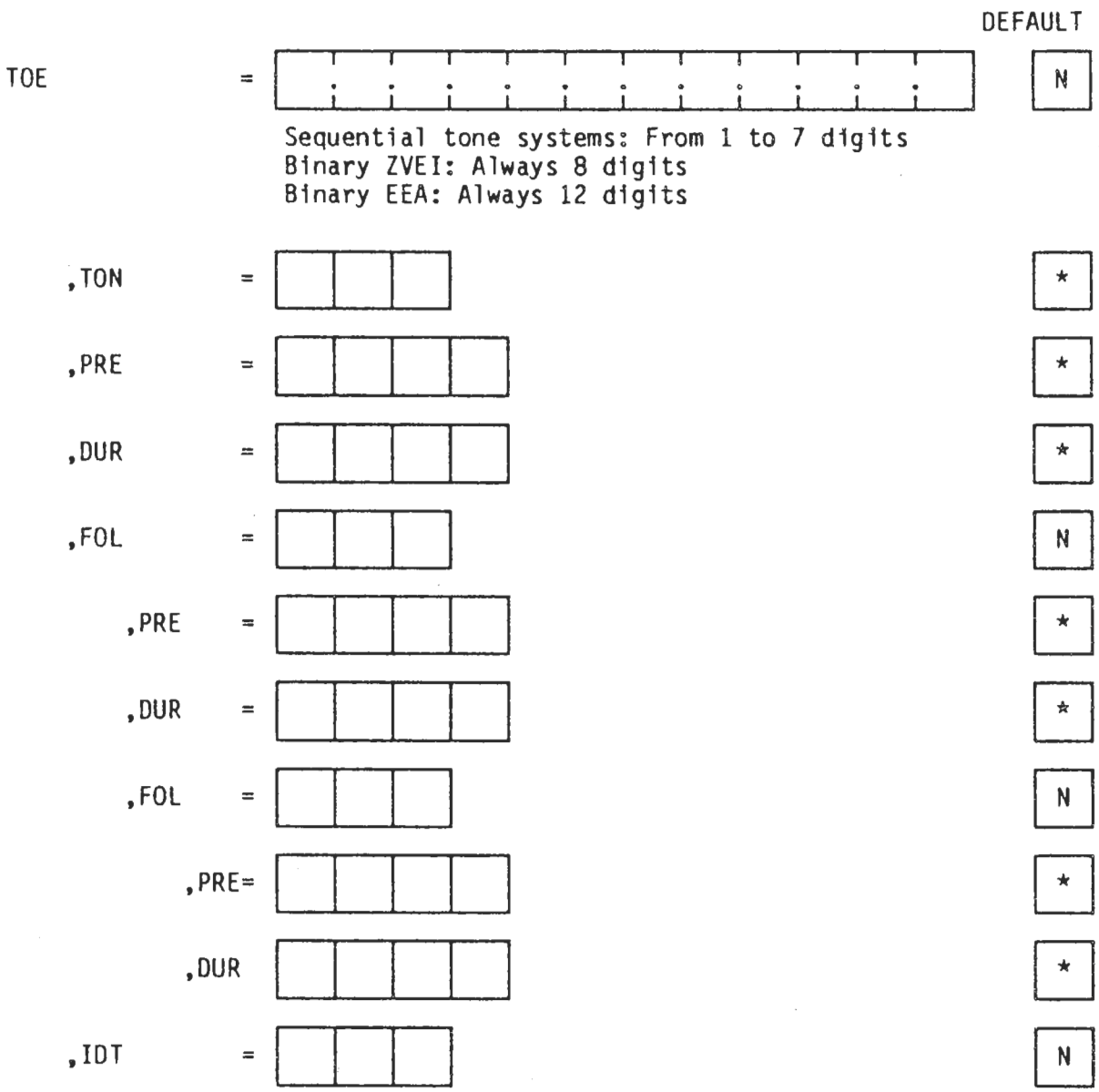
* = Value as assigned to the corresponding main function TON= and its subfunctions.

3.3.6. TRANSMIT ON FIRST



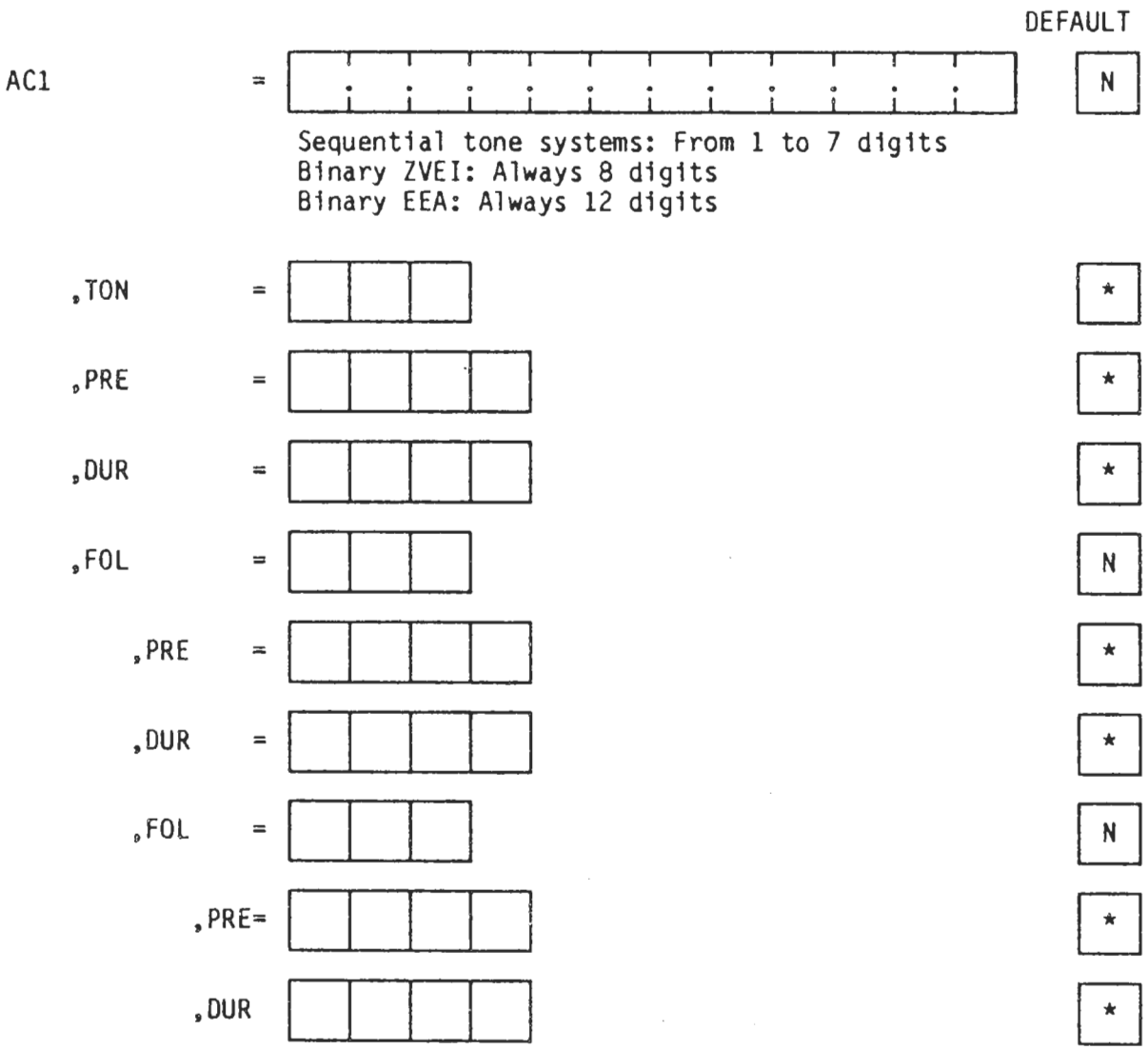
* = Value as assigned to the corresponding main function TON= and its subfunctions.

3.3.7. TRANSMIT ON EVERY



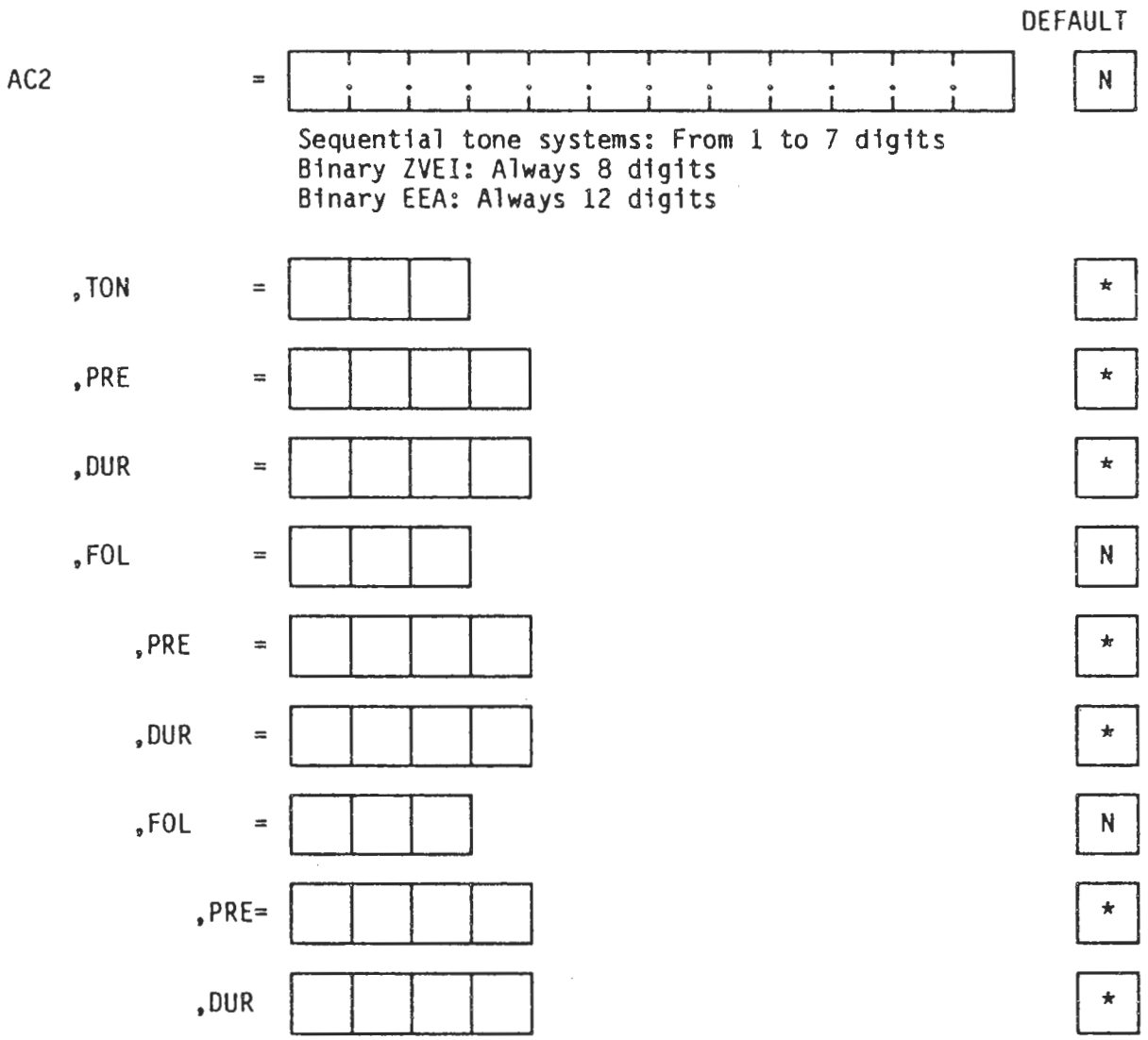
* = Value as assigned to the corresponding main function TON= and its subfunctions.

3.3.8. FIRST ACKNOWLEDGE



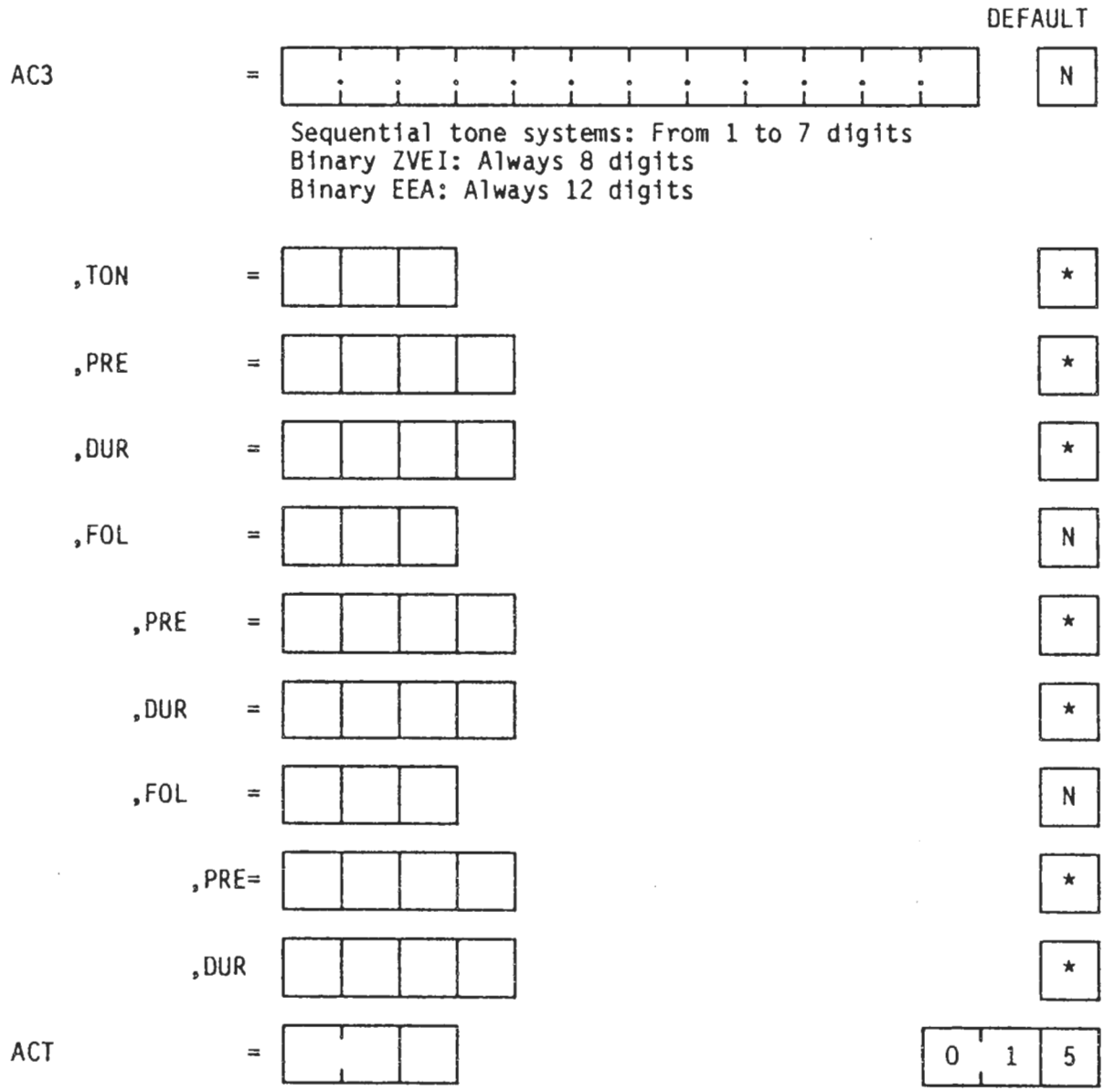
* = Value as assigned to the corresponding main function TON= and its subfunctions.

3.3.9. SECOND ACKNOWLEDGE



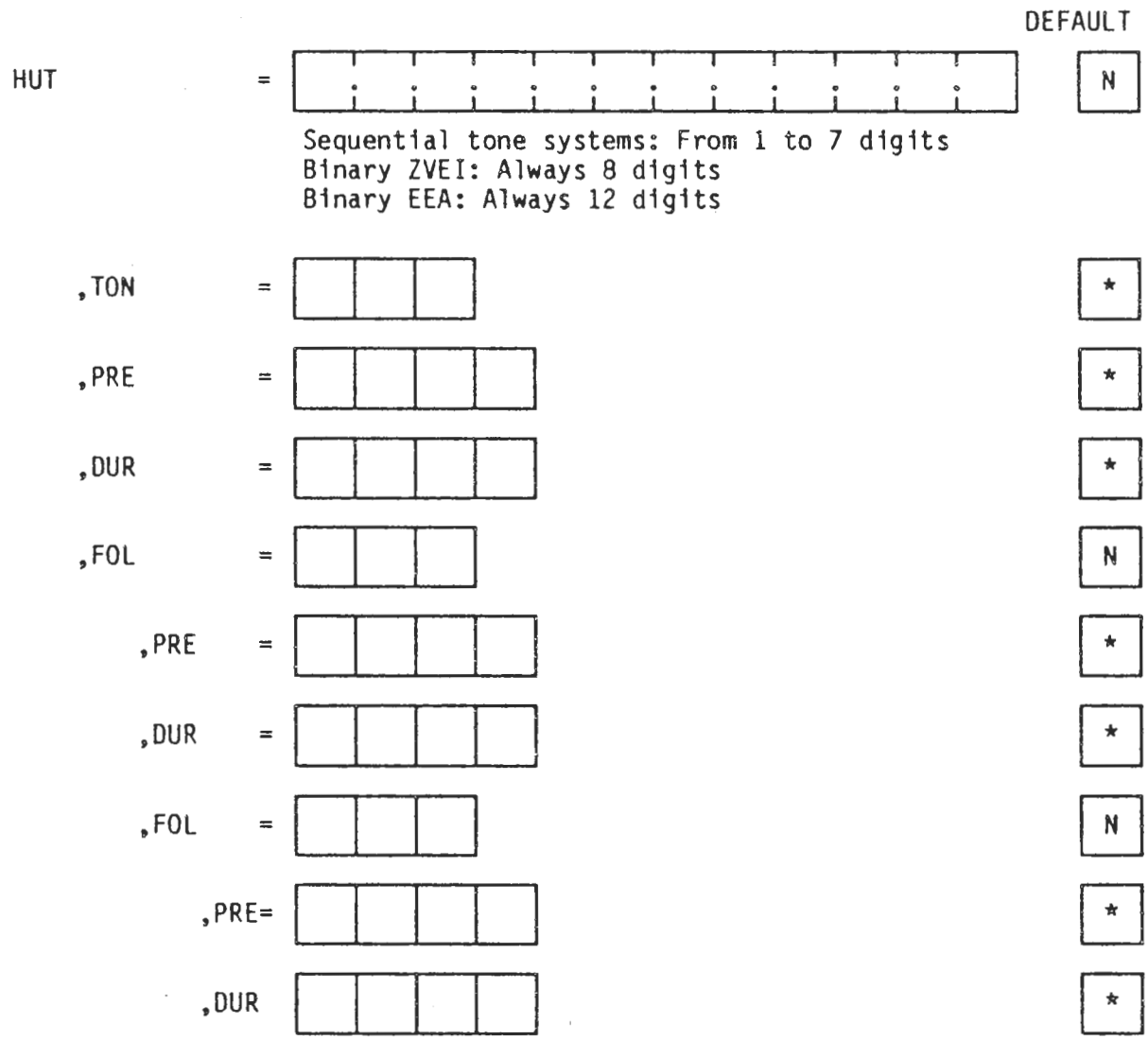
* = Value as assigned to the corresponding main function TON= and its subfunctions.

3.3.10. THIRD ACKNOWLEDGE



* = Value as assigned to the corresponding main function TON= and its subfunctions.

3.3.11. HANG-UP



* = Value as assigned to the corresponding main function TON= and its subfunctions.

3.3.12. AUXILLIARY ENCODER

DEFAULT

BYE = [. . . . .] N

Tone system always DTMF

STF = [. . . . .] N

Sequential tone systems: From 1 to 7 digits
Binary ZVEI: Always 8 digits
Binary EEA: Always 12 digits

,TON= [ ] [ ] [ ] *

TTF = [. . . . .] N

Sequential tone systems: From 1 to 7 digits
Binary ZVEI: Always 8 digits
Binary EEA: Always 12 digits

,TON= [ ] [ ] [ ] *

3.3.13. DECODER

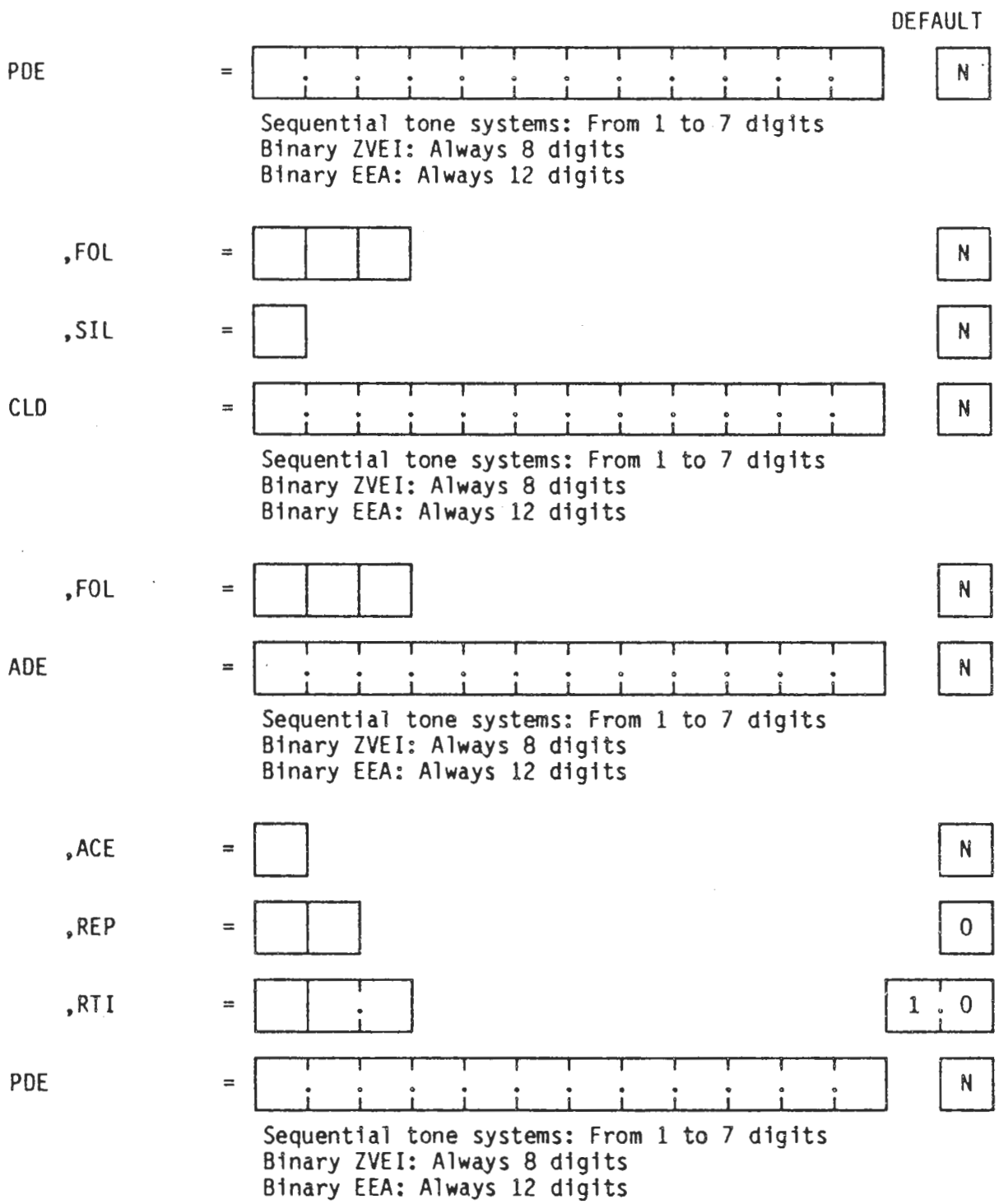
DEC = [. . . . .] N

Sequential tone systems: From 1 to 7 digits
Binary ZVEI: Always 8 digits
Binary EEA: Always 12 digits

,FOL= [ ] [ ] [ ] N

* = Value as assigned to the corresponding main function TON=

3.4. CODEPLUG


DEFAULT
PDE =
N
Sequential tone systems: From 1 to 7 digits
Binary ZVEI: Always 8 digits
Binary EEA: Always 12 digits
,FOL =
N
,SIL =
N
CLD =
N
Sequential tone systems: From 1 to 7 digits
Binary ZVEI: Always 8 digits
Binary EEA: Always 12 digits
,FOL =
N
ADE =
N
Sequential tone systems: From 1 to 7 digits
Binary ZVEI: Always 8 digits
Binary EEA: Always 12 digits
,ACE =
N
,REP =
0
,RTI =
1 . 0
PDE =
N
Sequential tone systems: From 1 to 7 digits
Binary ZVEI: Always 8 digits
Binary EEA: Always 12 digits

		DEFAULT
CNU	=	1
GND	=	N
CGE	=	N
CH1	=	N
CH2	=	N
CH3	=	N
CH4	=	N
CH5	=	N
CH6	=	N
CH7	=	N
CH8	=	N
CH9	=	N

EF SOFTWARE NOMENCLATURE

			DEFAULT
C01	=		N
C02	=		N
C03	=		N
C04	=		N
C05	=		N
C06	=		N
C07	=		N
C08	=		N
C09	=		N
C10	=		N
C11	=		N
C12	=		N
C13	=		N
C14	=		N

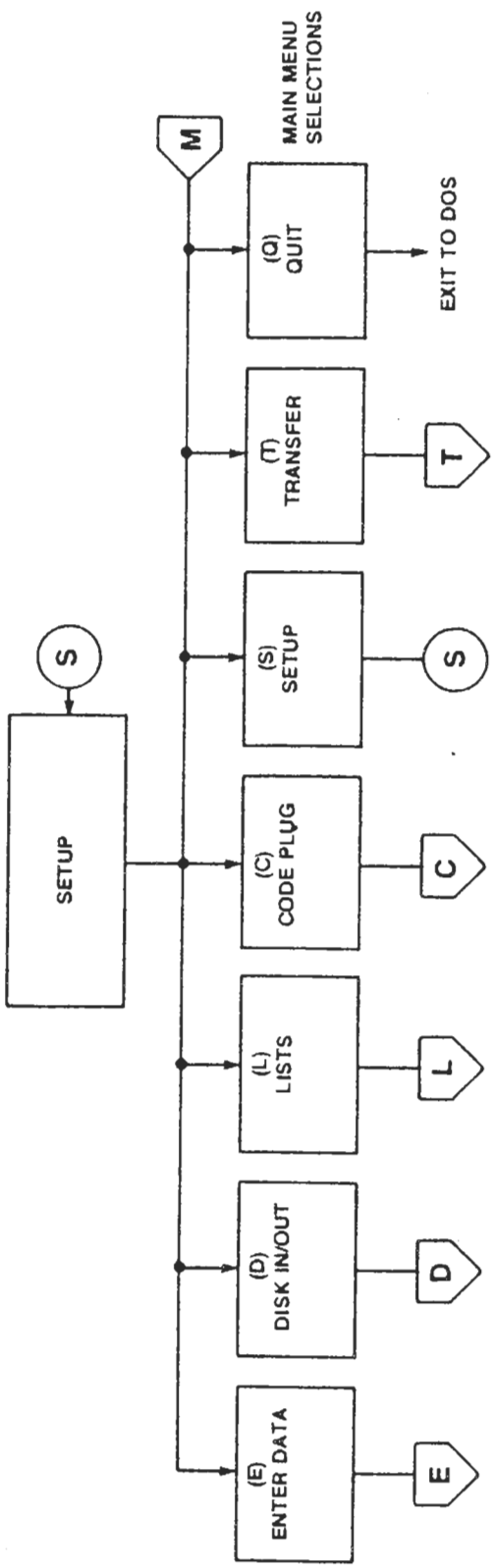
			DEFAULT
C15	=		N
C16	=		N
C17	=		N
C18	=		N
C19	=		N
C20	=		N
C21	=		N
C22	=		N
C23	=		N
C24	=		N
C25	=		N
C26	=		N
C27	=		N
C28	=		N

SECTION 4

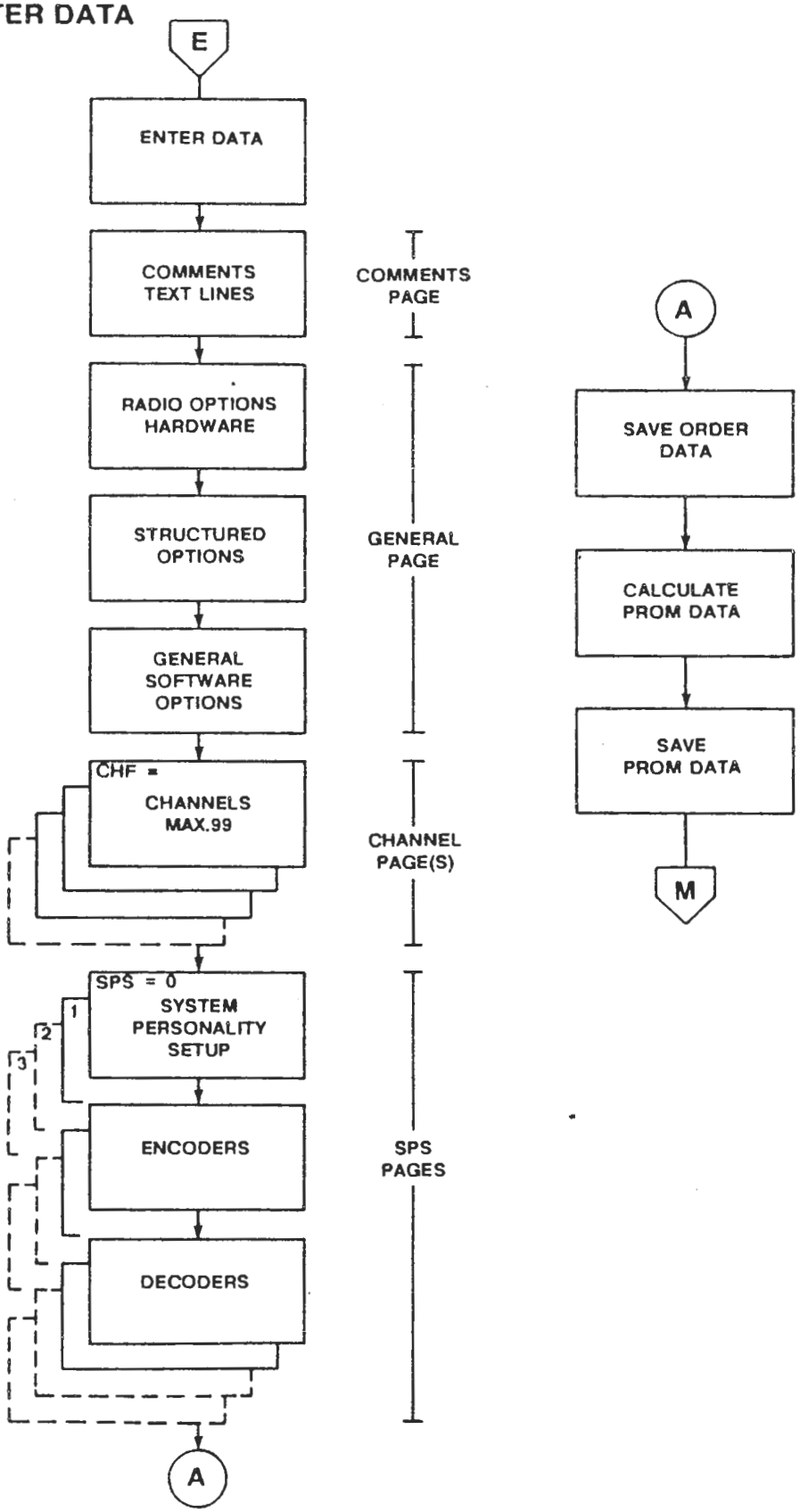
PROGRAM STRUCTURE

4. PROGRAM STRUCTURE

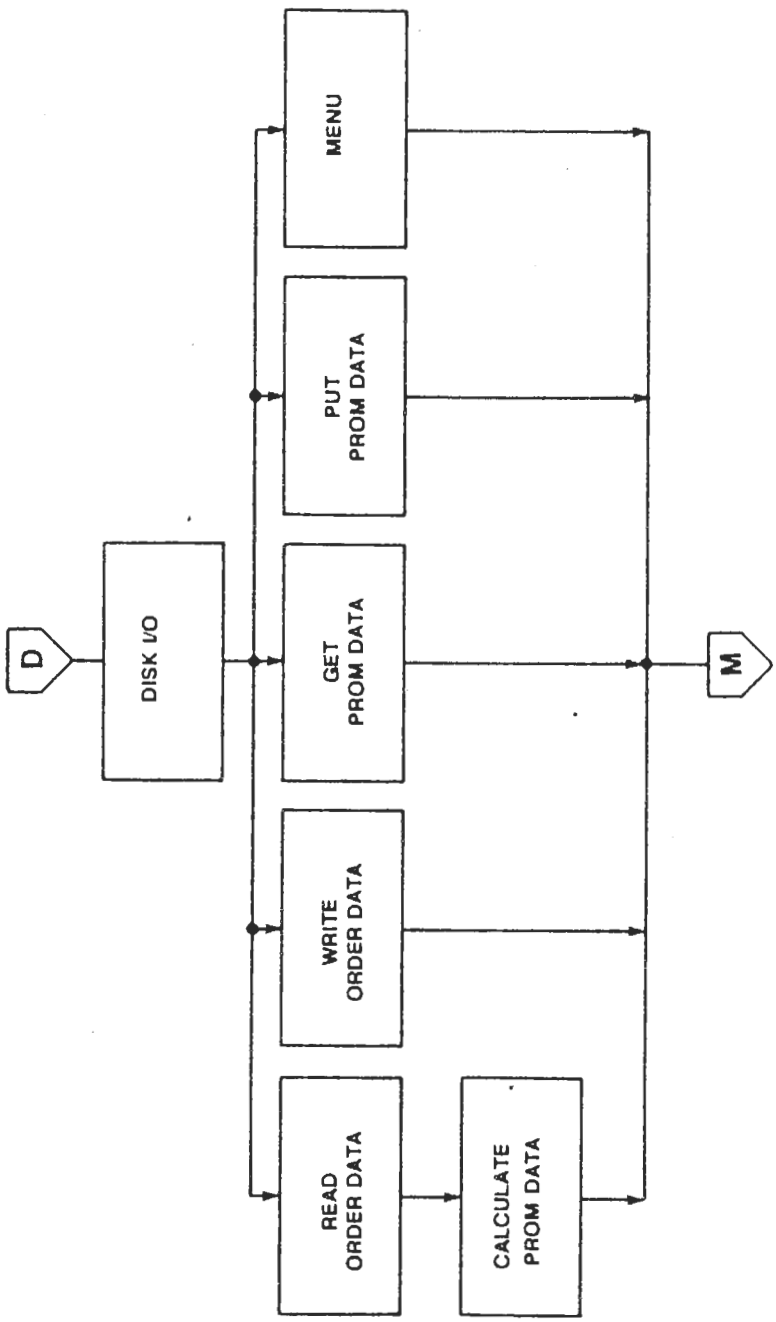
4.1. SETUP



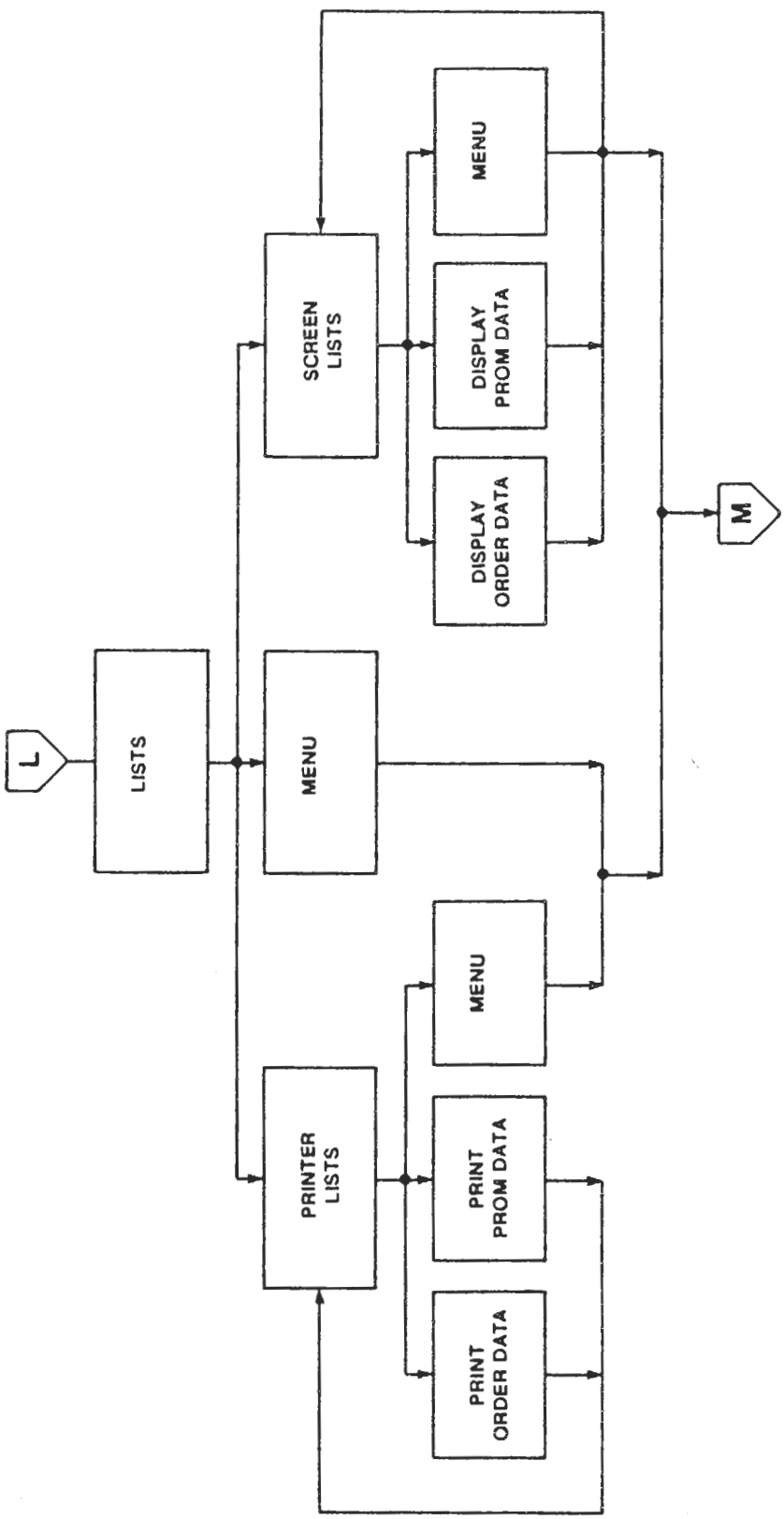
4.2. ENTER DATA



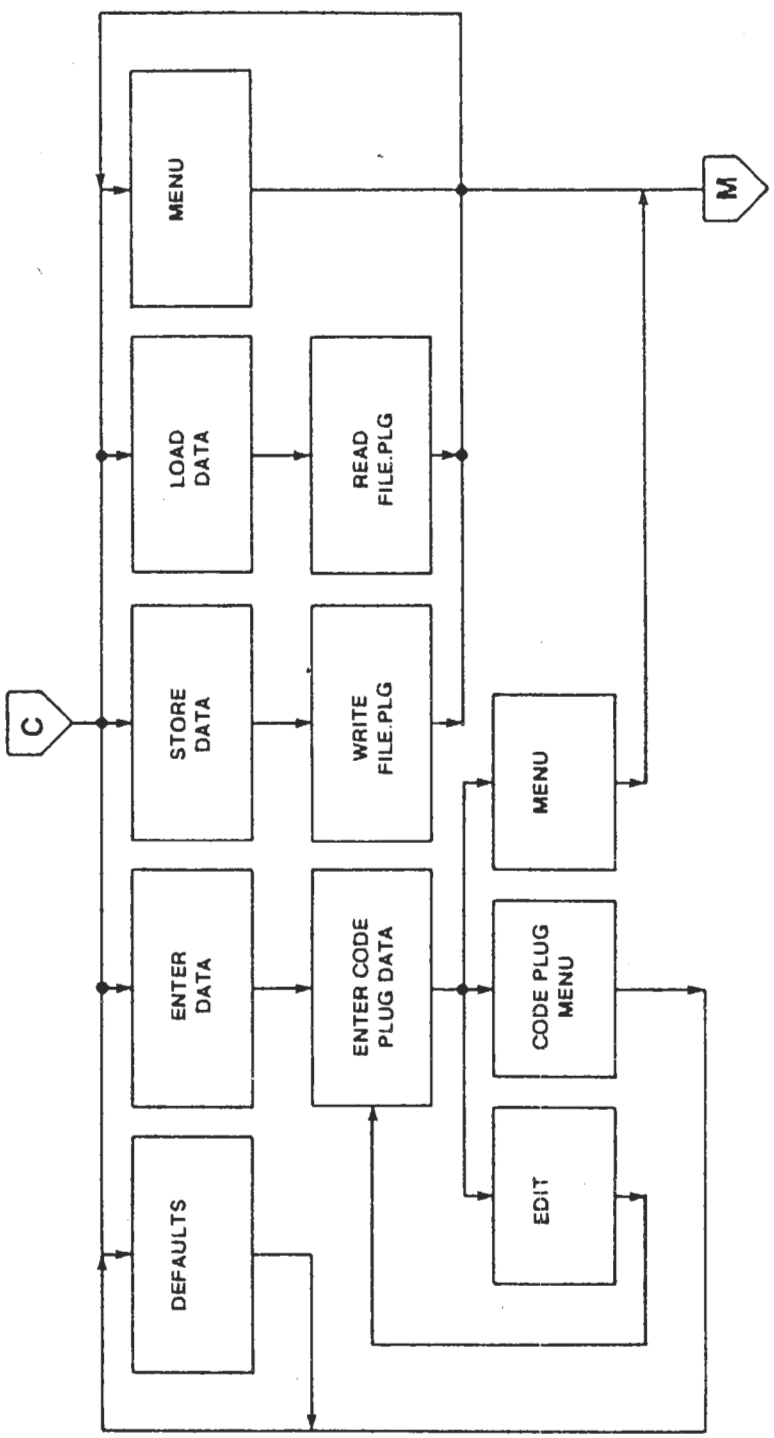
4.3. DISK IN/OUT



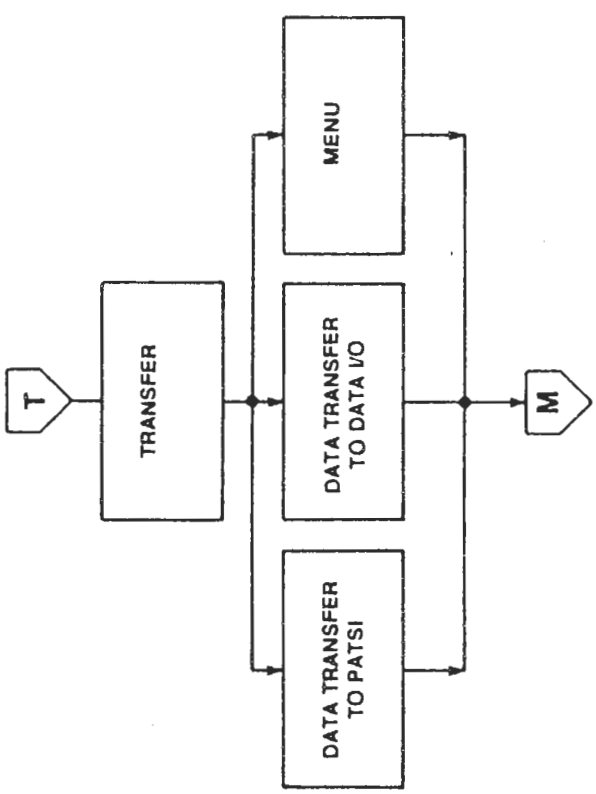
4.4. LISTS


L
LISTS
MENU
SCREEN LISTS
MENU
DISPLAY PROM DATA
DISPLAY ORDER DATA
M
MENU
PRINTER LISTS
PRINT PROM DATA
PRINT ORDER DATA

4.5. CODE PLUG


MENU
M
LOAD DATA
READ FILE.PLG
C
STORE DATA
WRITE FILE.PLG
MENU
ENTER DATA
ENTER CODE PLUG DATA
CODE PLUG MENU
EDIT
DEFAULTS

4.6. TRANSFER


T
TRANSFER
MENU
DATA TRANSFER TO DATA I/O
DATA TRANSFER TO PATSI
M

SECTION 5

SET UP PAGE

5. SET UP PAGE

```
------------------------------ SETUP --------------------------------

 Year and Week is stored in Personality Prom !
Please enter the Year!   (e.g. '88')   88
Please enter the Week!   (e.g. '01')   01



Path to store data?

Example: C:\CQM6000\EFDATA

Note: If current directory (A:\) is wanted press RETURN.
```

The Set-up page is used to input the date and the path to the directory and subdirectory, if used, to store the data files.

5.1. YEAR

Syntax: (88 - 99)

Only years between 1988 and 1999 will be valid, and the program will write the year in the personality prom for documentation purposes.

5.2. WEEK

Syntax: (01 - 53)
Only weeks between 01 and 53 will be valid and the program will write the week in the personality prom for documentation purposes.

5.3. PATH

Syntax: {drive:}\{directory}\{subdirectory}

Default: Current drive and directory.

Enter the disk drive, directory and subdirectory, if used.
The path will be used to store data files and also to load existing data files.

5.4. IMPORTANT

The path must be to an existing drive and directory, otherwise an error will occur during a disk read or disk write operation.
See also Disk I/O.

SECTION 6

ENTER DATA

6. ENTER DATA

The data entry function has been divided into the following pages:

- Comments page (6.2)
- General page (6.3)
- Channel pages (6.4)
- System Personality pages (see next chapters)

The data to enter are derived from the STORNOPHONE 6000 EF SOFTWARE NOMENCLATURE and the program checks all data for validity and syntax before accepting the inputs.

6.1. GENERAL FUNCTIONS

6.1.1. DATA EDIT

When a page has been completed the operator has the option of approving the page or if not the program will return to the top of the page and allow new data to be input. When data have been type always press [ENTER] .

6.1.2. DEFAULT VALUES

All Stornophone 6000 software nomenclature nmemonics have been assigned a default value which will be displayed when executing the program.
Pressing the [ENTER] key selects the default value and advances to the next input field.

6.1.3. HELP

The bottom line of the screen continously displays the valid data for the present input field or prompts the operator if the syntax is not accepted, the data are invalid or, when a page has been completed if the page is OK.

6.1.4. ADDITIONAL HELP

Pressing function key F1 when the cursor is placed in an input field will open a window at the top of the screen in which additional help information for the present field is displayed.
Press {Enter} to close the help window and proceed with the data input.
If no additional help is available for a particular function the message:

"- no additional information available -"

is displayed.

6.1.5. ENTER DATA

When the (E)nter data function is selected the program prompts:

INPUT: use default values (Y/N)

If the response is (Y)es the program will assign the default values to each software function and subfunction.

If the response is (N)o the program prompts for a data File to be read? (without .dta).
The default file is: Temp.

When a file name has been entered the program reads the file, if existing, and then prompts:

Calculate prom? (Y/N)

If the response is (Y)es the program calculates the prom data and proceeds to the Comments page.

If the response is (N)o the program jumps directly to the Comments page.

6.2. COMMENTS PAGE

```
CQM6000: Software EF-R5.0    EF Field Programmer.       << Input: Comments >>
-------------------------------------------------------------------------------

You may enter three lines of text to be stored in orderfile :

First comment line
Second comment line
Third comment line

The following line will be stored in the personality prom (max 16 char.)

Personality text

(Example: made in service)




-------------------------------------------------------------------------------
ok?    (Yes/No/Menu)
```

6.2.1. OPERATOR COMMENTS

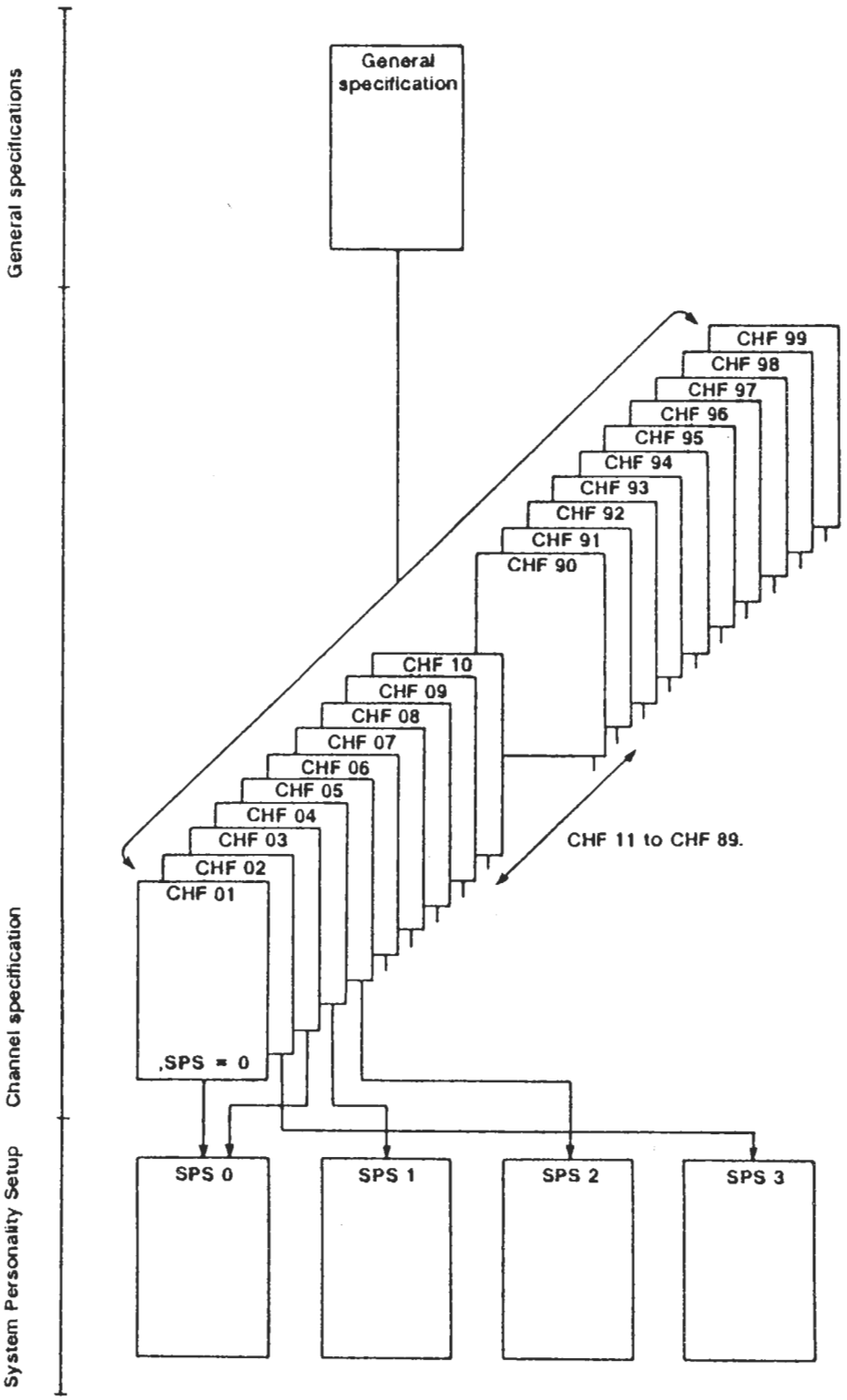
The Comments page allow the operator to enter 3 lines of text each line being up to 80 characters long.
The input lines may be used to include any comments, e.g. the customer reference. job reference or radio system.
The text lines are appended to the order data file and if this file is later loaded the comments will be displayed.

6.2.2. PROM COMMENT

A text line consisting of max. 16 characters may be typed and will be stored in the personality prom. This text may later be used to identify a radio personality prom.

When the lines of operator comments have been entered the operator has the option of

OK? (Y)es = Proceed to General page
OK? (N)o = Edit text lines
OK? (M)enu = Return to Main menu.



The CQM 6000 EF software nomenclature structure.

6.3. GENERAL PAGE

```
CQM6000: Software EF-R5.0    EF Field Programmer.       << Input: General >>
-------------------------------------------------------------------------------
Radio:     CQM6112S25CxL
Options:   A0 B0 C0     EF     G0 HA
SerialNo:    F8016M000001      CB60

                                          Min.Volume:         MIV= 0
                                          Max.Volume:         MAV= 8
Codeplug Number:    CNU= 0001             Default Volume:     DEV= N
                                          Group Call Vol:     GCV= P
Ext. I/O-Lines:     IOL= 1
                                          Alert Volume:       ACA= 6
ON/OFF key disab:   ODA= 1                 Alarm Time:       ,ALT= 1.0
 Time Off Timer:   ,TIO= N
                                          Acoustic Feedb.:    AFB= Y
Channel Digits:     CDI= 2
Grouptone Entry:     GTE=N
CTCSS Group:        CGG= N
Power Reduction:    RPL= N


-------------------------------------------------------------------------------
ok?    (Yes/No/Menu)
```

The General page is used to specify the **radio hardware**, the **structured hardware** options and the **serial number** of the radio for which the personality prom is being created.

Also **general software specifications** have been placed on this page.

6.3.1. RADIO HARDWARE

The radio type is related to the frequency band and channel spacing, the maximum transmitter power and the type of installation.
This information can normally be found on the radio's type label.

6.3.1.1. Frequency band

Default = 11

CQM6xx

xx = 11	136 - 174 MHz
xx = 33	68 - 88 MHz
xx = 66	403 - 470 MHz
xx = 77	174 - 225 MHz

Note: The frequency band is related to structured options Ax and Bx which specify High or Low band, if used.

6.3.1.2. Channel spacing

Default = 2

CQM6xxy

y = 2	25 kHz channel spacing
y = 3	20 kHz channel spacing
y = 4	12.5 kHz channel spacing

6.3.1.3. Transmitter power

Default = 25

CQM6xxySww

Maximum transmitter power in watts.

Standard options are: 01, 06, 10, 15, 25

6.3.1.4. Installation

Default = L

CQM6xxySwwCi

The installation options is used to select the type of installation in which the radio is being used.

L = Local controlled mobile installation

R = Remote controlled mobile installation

P = Portable

6.3.2. STRUCTURED HARWARE OPTIONS

6.3.2.1. Structured option A and B Default = A0 B0

Structured options A and B are only mandatory if the radio type is CQM77x in which case the frequency band has been split in low band and high band.

A0 and B0 are the only valid combination for all other bands except the 174 - 210 MHz.

Structured option Ax relates to the transmitter frequency band {H/L} and Bx relates to the receiver frequency band.

AL, BL = 174 - 210 MHz

AH, BH = 190 - 225 MHz

6.3.2.2. Structured option C

Structured option C0 is used when the radio has no channel guard decoder in which case software option CGD = N must be used.

Structured option CD is used if the radio has a channel guard decoder fitted in which case CGD = {group or frequency} must be selected.

6.3.2.3. Structured option E Default = EF

Structured option EF defines the software package and must always be EF.

6.3.2.4. Structured option G Default = 0

Structured option Gx defines the frequency stability of the radio.

G0 = Standard stability

GB = 5 ppm stability

GC = 2 ppm stability

6.3.2.5. Structured option H Default = H0

Structured option Hx defines the type of personality prom.

H0 = No personality prom delivered
HA = EPROM (UV-prom-J707923P1)
HB = EEPROM (Electrically Erasable Prom - J708345P2)

6.3.3. SERIAL NUMBER Default = F8536M000001

The serial number input is programmed in the personality prom's manufacturing and service information area for documentation purposes.

6.3.3.1. Syntax

The following syntax must be used:

F = Any letter (factory identification)
8 = Last digit of the year
53 = the week of the year
6 = 6000 family - mandatory - always 6
M = always = M
000001 = Serial number.

6.3.3.2. Control option CB60 Default = CB60

The control option defines the type of control used with the radio. The actual information may be obtained from the type label.

CB60 = Panel control (local)
CB61 = Handset control

6.3.4. GENERAL SOFTWARE OPTIONS

6.3.4.1. Code plug number

CNU = {0001 . . . 9999} Default = 0001

The code plug number must always be specified whether used or not. If code plug is not installed use the default value.

When the radio system uses the code plug option the number assigned to CNU = must be the same for both the radio and the code plug.

The radio software only accepts a code plug with a code plug number match.

6.3.4.2. External IN/OUT lines

IOL = {1/2} Default = 1

The 25-pin D-type connector on the rear of the radio has the following connections depending on the selected IOL = .

Pin	Function, IOL = 1	Function, IOL = 2
1	Battery +	Battery +
2	Battery +	Battery +
3	Carrying cassette	Carrying cassette
4	PTT button	PTT button
5	H-Bus service request	H-Bus service request
6	H-Bus direction	H-Bus direction
7	H-Bus data in/out	H-Bus data in/out
8	On/Off reset	On/Off reset
9	+5 Volt (Output)	+5 Volt (Output)
10	RX line	RX line
11	Processed RX out	Processed RX out
12	Battery -	Battery -
13	Battery -	Battery -
14	Battery +	Battery +
15	Ignition switch	Ignition switch
16	Car radio mute	Car radio mute
17	Car horn relay	Car horn relay
18	Signal ground	Signal ground
19	Microphone	Microphone
20	Tone key (ENC)	Emergency button (TNC)
21	Hook switch	Hook switch
22	TX line	TX line
23	Loudspeaker +	Loudspeaker +
24	Loudspeaker -	Loudspeaker -
25	Battery -	Battery -

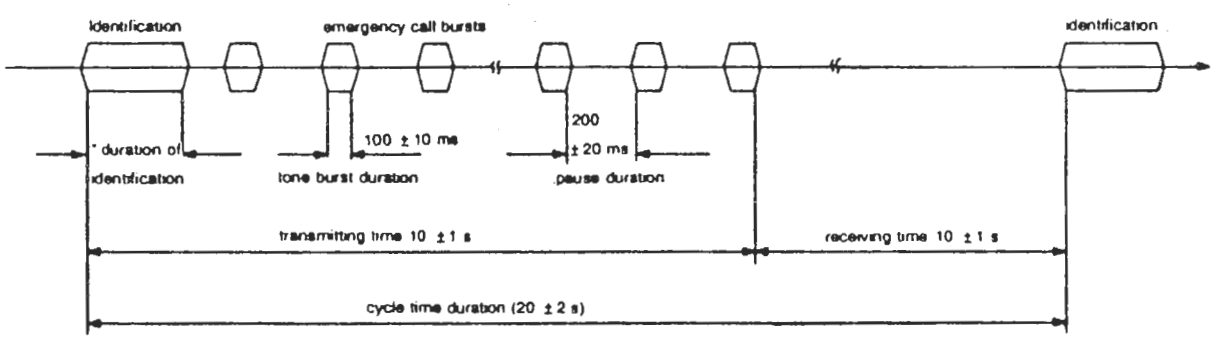
As you will see above, pin 20 on the connector has a different function if the IOL is changed. The default value is IOL = 1; IOL = 2 is used if the third encoder telegram (emergency) is needed. Below, the emergency call procedure according to the ZVEI recommendation will be explained in details.

6.3.4.3. Emergency calls

Stornophone 6000 with EF software meets the ZVEI recommendation for emergency calls. The emergency call is released by pushing an external switch connected to pin 20 on the rear connector. When the emergency button is pushed, the third encoder telegram (TNC) is transmitted. TNC must give an identification of the transmitting radio and must therefore be specified as the identity of the radio. Sequential and binary signalling as well as auxiliary telegrams may be used.

Activation of the emergency button will not be indicated on the control box.
When the emergency button has been pushed, the radio will switch to absent mode if the on/off button is used. Switching off completely is only possible by disconnecting the radio from the power supply or by selective calling from the base.

After transmission of the TNC telegram the microphone is switched through to permit the driver to speak without having to use the push-to-talk button. The radio is switching constantly between transmission and reception every 10 seconds. During transmission, a special emergency call signal is added. This signal will be heard by anyone monitoring the channel, indicating that an emergency situation has arisen.



* Duration of identification according to the ZVEI recommendations on transmission procedures of the five tone sequential system and the digital transmission procedures for identifications and the like

Emergency call procedure.

6.3.4.4. On/Off key disable

ODA = {0/1/2} Default = 1

ODA = 0	The on/off key is disabled and the radio is always on if battery power is present.
ODA = 1	Normal on/off key
ODA = 2	Absent mode enabled.

Turning the radio off when absent mode is enabled will cause the radio to be on even if turned off. Only the control box will turn off but the radio will still be on and in operation.

6.3.4.5. Time off timer

,TIO = {N/10 . . . 2540} Default = N

The time off timer is used to automatically turn the radio off when the timer expires. The timer is reset every time the radio is turned on after having been off. The timer may also be reset by the ignition switch provided that cable kit CC6006 is used in the installation.

N = Time off timer disabled

Value = 10 - 2540 minutes in step of 10 minutes.
The input must be an integer.
ex.: TIO = 600 means that the radio automatically turns off 10 hours after last turn on.
See also ODA =

6.3.4.6. Number of channel digits

CDI = {0/1/2} Default = 2

The number of channel digits should correspond with the digits used to specify CHF = .

CDI = 0	deletes the channel field in the radio display and can consequently only be used for single channel radios.
CDI = 1	can be used for radios with channel numbers 1 - 9.
CDI = 2	can be used for radios with channel numbers 01 - 99.

Note that the program automatically checks all channel numbers assigned to CHF = and program the personality prom accordingly.

6.3.4.7. Group tone entry

GTE = {Y/N} Default = N

The group tone entry function is used to allow the operator to enter group tones in the address field and hence call a group of mobiles.

GTE = N disables the function.

GTE = Y enables the [*] button to be used as group tone button and insert the group tone defined by GRP = in the address field.
When a group tone is entered the remaining positions in the telegram is automatically filled with group tones (hieracical group call).

6.3.4.8. CTCSS Group

CGG = {N/A/B/C} Default = N

The Continuous Tone Carrier Squelch System (CTCSS) group defines the tone table to be used. The CTCSS signalling is according to recommendation RS220A.
If the tones are to be code plug released either CGG = A or B or C must be selected.

CGG = N will allow CTCSS tones to be assigned to each channel using the CGE = and the CGD = functions.

Note that CTCSS tone decoding is only possible if structured option CD is available.

Selecting CGG = {group} the number of the tone in the table {0 - D} must be assigned to CGE = and CGD = .

6.3.4.9. CTCSS tones according to RS220A

Group A (Hz):

67.0	77.0	88.5	100.0	107.2	114.8	123.0	131.8	141.3	151.4	162.2
0	1	2	3	4	5	6	7	8	9	A

173.8	186.2	203.5
B	C	D

Group B (Hz):

71.9	82.5	94.8	103.5	110.9	118.8	127.3	136.5	146.2	156.7	167.9
0	1	2	3	4	5	6	7	8	9	A

179.9	192.8	210.7
B	C	D

Group C (Hz):

74.4	79.7	85.4	91.5
0	1	2	3

See also CGD = and CGE =

6.3.4.10. Reduced power level

RPL = {N, 0.6 - 25} Default: RPL = N

Reduced power level used on specified channels.

RPL = N	Reduced power level not used on any channel. Subfunction, RPL related to CHF is skipped and programmed to full power on all channels.
RPL = {value}	The value specified is not programmed in the personality prom but only used to specify the level to which the power is reduced on chanels that should be operated on low power.

Normally the power level must be specified to be not less than 10% of maximum power which means that for a 6 W radio the lowest permissible RPL = 0.6 and for a 25 W radio RPL = 2.5.
Any value between the low and high power level is valid.

6.3.4.11. Minimum values for reduced power level

	Minimum Value in Watt for RPL at:			
Nominal Value	80 MHz	160 MHz	200 MHz	450 MHz
1 Watt	1.0	0.6	-	0.6
6 Watt	1.0	0.6	2.5	0.6
10 Watt	1.0	2.5	2.5	2.5
15 Watt	2.5	2.5	2.5	2.5
25 Watt	2.5	2.5	2.5	2.5

6.3.4.12. Maximum value for reduced power level

When a Stornophone 6000 is placed in a carrying cassette (Portable option), the output power is automatically reduced to the RPL value on all channels. This is done to protect the user against any harm caused by electromagnetic radiation. For this reason the value of RPL must not exceed 7 Watt.

Example:
A 160 MHz radio unit is ordered with a nominal output of 10 Watt. According to the table above, the minimum value is 2.5 Watt. In other words, RPL can be assigned a value in the range from 7 down to 2.5 Watt.

If you enter:

```
RPL '          = 3.6
                 :
                 :
CHF            = 01
                 :
      ,PWR     = Y
CHF            = 02
                 :
      ,PWR     = N
```

You will program the radio to transmit at a level of 3.6 Watt on channel 01, while on channel 02, the output power is 10 Watt.
If you insert this radio in a carrying cassette, the transmitter power will be 3.6 Watt on both channels.

6.3.4.13. Minimum volume

MIV = {0, . . . 8} Default: MIV = 0

Minimum volume is used to program the volume control to a range of steps. The audio volume can be adjusted in 8 steps and cannot be set to steps lower than that programmed as minimum.
If minimum volume is equal to maximum volume the volume up and volume down buttons are disabled.
Legal range for minimum volume is 0, 1, 2, 3, 4, 5, 6, 7, 8 but can obviously not be programmed higher than the value specified by MAV = .

See also MAV =

6.3.4.14. Maximum volume

MAV = {MIV TO 8} Default: MAV = 8

Maximum volume is used to program the volume control to a range of steps. The volume control can be adjusted in 8 steps and cannot be set to steps higher than that programmed as maximum. If maximum volume is equal to minimum voltage the volume up and volume down buttons are disabled.
Legal range for maximum volume is from the step specified by MIV = to 8.
See also MAV =

6.3.4.15. Default volume

DEV = {N/1 . . . 8} Default = N

The default volume defines the volume setting when the radio is turned on.

DEV = N	defines the volume to be set to the value as when the radio was turned off.
DEV = {1 - 8}	defines a fixed volume to be set to the selected step every time the radio is turned on.

6.3.4.16. Group call volume

CGV = {P/MIV - MAV}

The group call volume defines the volume of the signal in the loudspeaker indicating that a group call has been received.

CGV = P	defines the volume to be the step selected by the radio operator.
CGV = MIV - MAV	defines a group call signal to be sounded at a fixed step as selected. Any step between the values assigned to MIV = and MAV = can be selected.

6.3.4.17. Alert volume

ACA = {N/O - MAV} Default = 6

The alert volume defines the volume step to be used for the signal indicating that a call has been received.

ACA = N disables the alert signal

ACA = 0 - MAV sets the volume of the call signal to the selected step which cannot be higher than the value assigned to MAV = .

6.3.4.18. Alert time

,ALT = {1 . . 25} Default = 1

The alert time defines the length of the alert tone and can be specified to values between 1 and 25 seconds.

If ACA = N this function is irrelevant and skipped by the program.

6.3.4.19. Acoustic feed back

AFB = {Y/N} Default = Y

The acoustic feed back function defines whether the operator should hear a beep every time a button is depressed.

AFB = Y enables the feed back beep

AFB = N disables the feed back beep

6.3.4.20. General page approval

When the input to the general page is finished the program prompts:

OK? {Yes/No/Menu}

Press Y to proceed to the next page.

Press N to edit the data in the general page.

Press M to return to the main menu.

6.4. CHANNEL PAGE

```
CQM6000: Software EF-R5.0    EF Field Programmer.        << Input: Channels >>
-------------------------------------------------------------------------------
CHF ,TXF        ,RXF        ,CGE    ,CGD    ,PWR  ,PLG  ,SPS
1   150.000000 150.000000   N       N       N     N     0
2   156.000000 156.000000   N       N       N     N     1
3   156.025000 156.025000   100.0   100.0   N     N     0
4   156.025000 156.025000   103.5   103.5   N     N     1
N

-------------------------------------------------------------------------------
ok?    (Yes/No/Menu)
```

The channel page(s) allows up to 99 channels to be defined for a radio. When a page is full the program automatically proceeds with a clear screen.

The channel input page consists of 8 columns for CHF = , TXF = , RXF = , CGE = , CGD = , PWR = , PLG = , and SPS =

Channels may be entered in any order and the bottom line constantly displays the valid input for the field in which the cursor is positioned.

6.4.1. CHANNEL NUMBER

CHF = {N/1 . . . 99} Default = N

All channel numbers must be defined between 1 and 99 and maximum 99 channels may be defined. The channel input routine is repeated for all channels and when the last channel has been defined specify CHF = N to leave the input procedure.

Before the program proceeds to the next page the operator must approve the channels when prompted: OK? {Yes/No/Menu}

If all channel data are correct type (Y)es to proceed.

If typing errors should be corrected type (N)o to edit the channel data. The program then begins to display data at the first channel line (CHF =) and the assigned data may be edited by typing new data in the input field. Press [ENTER] to go through the channel data lines.

Note: Entering CHF = N when positioned in the CHF field will delete all the remaining channel lines.

6.4.1.1. Transmitter frequency

,TXF = {Frequency in MHz} Default = none

The transmitter frequency for each channel used in the radio must be specified. The frequency range depends on the radio type and will be displayed on the bottom line of the screen. Any attempt to input an out of range frequency results in an error message and the cursor being placed in the field where the error occured.

Press [ENTER] when the input field shows the correct frequency.

Note: The frequency must be specified with up to 6 decimal digit but if the frequency is not in the correct frequency raster as defined by the radio type a warning will be displayed when the personality prom data are calculated. The program will, however, calculate data so that minimum frequency error is obtained.

6.4.1.2. Receiver frequency

,RXF = {Frequency in MHz} Default = none

The receiver frequency for each channel used in the radio must be specified.
The frequency range depends on the radio type and will be displayed on the bottom line of the screen. Any attempt to input an out of range frequency results in an error message and the cursor being placed in the field where the error occured.

Pressing [ENTER] without specifying a frequency will copy the transmitter frequency (TXF =) to the RXF = field.

Press [ENTER] when the input field shows the correct frequency.

6.4.1.3. Selfquieting

Certain receiver frequencies may be subject to selfquieting, i.e. harmonic frequencies of internal processor signals or mixer products may result in a frequency equal to or close to the receiver frequency. The program automatically checks each receiver frequency during personality data calculation for selfquieting and, if selfquieting may occur displays a message describing the remedies to avoid the problem.

Note: The receiver frequency may be specified with up to 6 decimal digits but if the frequency is not in the correct frequency raster as defined by the radio type a warning will be displayed when the personality data are calculated.
The program will, however, calculate data so that minimum frequency error is obtained.

6.4.2. CHANNEL GUARD ENCODER AND DECODER

CGE = { } CGD = { } Default = N

The channel guard (CTCSS signalling) can be defined in two ways depending on the value assigned to function CGG = .

6.4.2.1. CGG = {group A, B, or C}

The tone used on the channel is defined by assigning the tone number of the selected group to ,CGE = and ,CGD =

Group A (Hz)	Group B (Hz)	Group C (Hz)	Tone number
67.0	71.9	74.4	0
77.0	82.5	79.7	1
88.5	94.8	85.4	2
100.0	103.5	91.5	3
107.2	110.9	-	4
114.8	118.8	-	5
123.0	127.3	-	6
131.8	136.5	-	7
143.3	146.2	-	8
151.4	156.7	-	9
162.2	167.9	-	A
173.8	179.9	-	B
186.2	192.8	-	C

6.4.2.2. CGG = N

The tone used on the channel is specified by assigning a frequency (Hz) to the ,CGE = and the ,CGD = . The frequency must be specified with one decimal digit and a maximum of 15 different tones may be used. The program will display a warning if the number of channel guard tones exceeds the limit.

Note: Channel guard DECODER tones requires that the radio has structured option CD (decoder module) built in.

CGE = N or CGD = N defines that channel guard encoder, or decoder, is not used on the channel.

6.4.3. REDUCED POWER

PWR = {Y/N} Default = N

The ,PWR = subfunction specifies whether the transmitter power on the corresponding channel shall be reduced to the level defined by function RPL = or be at maximum.

PWR = N will cause transmitting at full power and PWR = Y will reduce the power level.

6.4.4. CHANNEL CODE PLUG RELEASE

,PLG = {Y/N} Default = N

The ,PLG = subfunction defines if the channel should be released only when a code plug with a proper match is inserted on the control head.

,PLG = N	will omit the code plug requirement.
,PLG = Y	will require the code plug to be inserted before the channel can be selected.

Refer to CODE PLUG PROGRAMMING for specification of the necessary code plug data.

6.4.5. SYSTEM PERSONALITY SET-UP

,SPS = {0/1/2/3}

Each channel specified for the radio must be assigned to a system personality set-up and a maximum of four set-ups may be used. Refer to the main function SPS =

When using different SPS = for the channels the program automatically requests input of data to define the corresponding SPS = pages.

SECTION 7

SYSTEM PERSONALITY SET UP PAGE

7. SYSTEM PERSONALITY SET-UP PAGE

The system personality set-up pages are used to define all information of system options, carrier control timer, and basic tone system options.
Up to four system personality set-ups may be defined and the syntax differs according to the selected default tone system.

```
CQM6000: Software EF-R5.0    EF Field Programmer.  << Input:  SPS=0 >>
-------------------------------------------------------------------------

                                        Carr.Contr.Timer:  CCT= N

Address Digits      ADI= 0
Status Digits       SDI= 0              Tone System         TON= ZV1
                                         Preamble Time:    ,PRE= S
Privacy:            PRI= N               Duration:        ,DUR= S
                   ,BDT= 30
                   ,MAT= Y               DTM-Mode Enable: ,DTM= Y
                   ,MAC= N               Pause:           ,PAU= 3

Push To Talk Adm.: PTA= 0               Group Digit:        GRP= A
 Codeplug needed: ,PLG= N                Pos.of Groupdig: ,POS= N
                                         Break down Time: ,BDT= 3
Tone key admit:     TKA= 0
 Codeplug needed: ,PLG= N

2nd Tonekey Adm.:  SKA= 0
 Codeplug needed: ,PLG= N


-------------------------------------------------------------------------
ok?    (Yes/No/Menu)
```

The program automatically displays and requests input of the data related to SPS as assigned to channels.

7.1. SYSTEM PERSONALITY SET-UP

SPS = {Y/N} Default = N

SPS = 0	Mandatory
SPS = 1	Extra as required
SPS = 2	Extra as required
SPS = 3	Extra as required

The SPS = is continuously being desplayed at the upper right screen corner.
Type (Y)es if the SPS = 1 or 2 or 3 should be programmed.

Queue mode can only be specified for SPS = 0.
The program always requires that SPS = 0 is programmed.
For each SPS = the following software nomenclature must be defined.

7.2. ADDRESS DIGITS

ADI = {0 . . . 7} Default = 0

ADI = 0	deletes the address field in the display.
ADI = 1 - 7	adjusts the length of the address field in the display to the selected number of digits and hence only references to these digits are valid when specifying the telegrams.

Example: ADI = 3
Only references to digits 1A, 2A and 3A are valid.

7.3. STATUS DIGITS

SDI = {0 . . . 2} Default = 0

SDI = 0 deletes the status field in the display.

SDI = 1 - 2 adjusts the length of the status field in the display to the selected number of digits and hence only references to defined status digits are valid when specifying the telegrams.

Example: SDI = 1
Only references to digit 1S is valid.

7.4. PRIVACY

PRI = {Y/N} Default = N

The privacy option defines the conditions under which the loudspeaker may be opened.

PRI = Y defines that the loudspeaker cannot be opened manually.

PRI = N defines that the loudspeaker may be opened manually by depressing the [♪] button.

7.5. PRIVACY BREAK DOWN TIME

,BDT = {0 . . . 254/N} Default = 30

The privacy break down timer defines the time from disappearance of a received carrier till the loudspeaker is automatically closed.

,BDT = N disables the times and hence there will be no automatic loudspeaker close.

,BDT = {0-254} defines the time in seconds after carrier disappearance till automatic loudspeaker closes.
The value must be an integer.

7.6. MONITOR AFTER TONE TRANSMISSION

,MAT = {Y/N} Default = Y

The ,MAT = subfunction defines the state of the loudspeaker after a tone telegram has been transmitted.

,MAT = Y defines that the loudspeaker shall remain open after the tone telegram has been transmitted.

,MAT = N defines that the loudspeaker shall be closed after operating the PTT-device, pushing the tone button [♪] or the second tone button [A] .

7.7. MONITOR AFTER CHANNEL SHIFT

,MAC = {Y/N} Default = N

The ,MAC = subfunction defines the state of the loudspeaker after a new channel has been selected.

,MAC = Y defines that the loudspeaker shal remain open after a new channel has been selected.

,MAC = N defines that the loudspeaker shall close when selecting a new channel.

7.8. PUSH-TO-TALK ADMIT CRITERIA

PTA = {0/1/2/3/N} Default = 0

The PTA = function defines the criteria to be associated with the PTT device.

PTA = N	PTT totally blocked
PTA = 0	Loudspeaker open or channel free
PTA = 1	Channel free
PTA = 2	Loudspeaker open
PTA = 3	No limitation

7.9. TONE KEY ADMIT CRITERIA

TKA = {0/1/2/3/N} Default = 0

The TKA = function defines the criteria to be associated with the tone [♪] button.

TKA = N	Tone key totally blocked
TKA = 0	Loudspeaker open or channel free
TKA = 1	Channel free
TKA = 2	Loudspeaker open
TKA = 3	No limitation

7.10. SECOND TONE KEY ADMIT CRITERIA

SKA = {0/1/2/3/N} Default = 0

The SKA = function defines the criteria to be associated with the second tone key [A]

SKA = N	Second tone key totally blocked
SKA = 0	Loudspeaker open or channel free

SKA = 1	Channel free
SKA = 2	Loudspeaker open
SKA = 3	No limitation

7.11. CODE PLUG NEEDED

,PLG = {Y/N} Default = N

The ,PLG = subfunction may be used for both PTA = , TKA = and SKA = to define that the criteria is also dependent of a proper code plug being inserted.

,PLG = N	defines that a code plug is not needed.
,PLG = Y	defines that the function may be operated only when a proper code plug is inserted.

7.12. CARRIER CONTROL TIMER

CTT = {N/1 - 254} Default = N

The CCT =	function defines the maximum duration of each transmission period. Prior to a time out a warming signal will be heard.
CTT = N	disables the carrier control timer and hence there is no limitation of a transmission period.
CTT = {1-254}	sets the timer to the specified number of seconds for one period of transmission. When the timer expires a warning signal is sounded and if the operator refuses to release the PTT device the radio automatically breaks the transmission.

7.13. TONE SYSTEM

TON = {ZV1/ZV2/ZV3/CCI/VDE/EEA/BZV/BEE/DTM/N} Default = N

The TON = function defines the default tone system of the radio. The selected default system must always be that used for tone decoders. For tone encoders the subfunction ,TON = may be used to assign a different tone system to be used for the particular encoder telegram. When defining the individual encoder telegrams the ,TON = S subfunction defines that the default tone system is used (S = Standard).

7.13.1. SEQUENTIAL TONE SYSTEMS

TON = ZV1: ZVEI 1 Recommendation
TON = ZV2: ZVEI 2 Recommendation
TON = ZV3: ZVEI 3 Recommendation
TON = CCI: CCIR Recommendation
TON = EEA: EEA Recommendation
TON = VDE: VDEW Recommendation

7.13.2. BINARY TONE SYSTEMS

TON = BZV: ZVEI Recommendation
TON = BEE: EEA Recommendation

7.13.3. DUAL TONE MULTI FREQUENCY (DTMF) SYSTEM

TON = DTM

7.13.4. TONE SYSTEM NOT USED

TON = N which automatically skips all nomenclature input for tone signalling (open system). Other SPS = may, however, use tone signalling.

Descriptions of the specification and the nomenclature input for the different types of tone signalling are found in separate sections.

Sequential tone systems	see section 8
Binary tone systems	see section 9
Mixed signalling systems	see section 10

SECTION 8

SEQUENTIAL TONE SYSTEMS

8. SEQUENTIAL TONE SYSTEMS

The sequential tone signalling circuitry is an integrated part of the radio hardware and hence no supplementary modules have to be fitted. All tone signalling can be defined by using the software nomenclature.

8.1. GENERAL TONE SYSTEM DATA

```
CQM6000: Software EF-R5.0    EF Field Programmer.  << Input:  SPS=0 >>
-------------------------------------------------------------------------------

                                          Carr.Contr.Timer:  CCT= N
Address Digits      ADI= 0
Status Digits       SDI= 0                Tone System         TON= ZV1
                                           Preamble Time:    ,PRE= S
Privacy:            PRI= N                 Duration:        ,DUR= S
                   ,BDT= 30
                   ,MAT= Y                 DTM-Mode Enable: ,DTM= Y
                   ,MAC= N                 Pause:           ,PAU= 3

Push To Talk Adm.: PTA= 0                 Group Digit:       GRP= A
 Codeplug needed: ,PLG= N                  Pos.of Groupdig: ,POS= N
                                           Break down Time: ,BDT= 3
Tone key admit:     TKA= 0
 Codeplug needed: ,PLG= N

2nd Tonekey Adm.:   SKA= 0
 Codeplug needed: ,PLG= N


-------------------------------------------------------------------------------
ok?    (Yes/No/Menu)
```

The input of tone system and the general tone system data should be repeated for all system personality set-ups used in the radio but will be described for SPS = 0 only.

SEQUENTIAL TONE SYSTEMS

TON	ZV1	ZV2	ZV3	CC1	EEA	VDE	REMARKS
Tone	Frequency (Hz)						
0	2400	2400	2200	1981	1981	2400	Normal Tones
1	1060	1060	970	1124	1124	1060	
2	1160	1160	1060	1197	1197	1160	
3	1270	1270	1160	1275	1275	1270	
4	1400	1400	1270	1358	1358	1400	
5	1530	1530	1400	1446	1446	1750	
6	1670	1670	1530	1540	1540	1670	
7	1830	1830	1670	1640	1640	1830	
8	2000	2000	1830	1747	1747	2000	
9	2200	2200	2000	1860	1860	2135	
A	2800	885	885	2400	1055	2800	Group tone
B	810	810	2800	930	930	810	
C	970	2800	810	2247	2247	970	Special Tones
D	885	2600	2600	911	911	675	Special Tones
E	2600	970	2400	2110	2110	2600	Repeat Tone
X	*)	*)	*)	*)	*)	*)	Don't care
Tone Length	70 msec			100 msec	40 msec	1000 msec	Default DUR = S
Pre-amble	140 msec			200 msec	100 msec		Default PRE = S

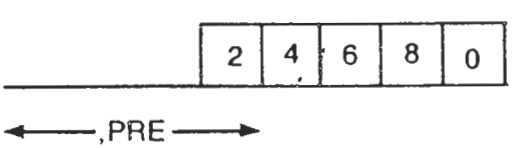
*) Decoders only, any frequency above with the right tone length.

Sequential tone signalling table

8.1.1. PREAMBLE TIME

,PRE = {N/S/10 . . . . 2540} Default = S

The preamble time ("Wake-up time") is the time from the instant the transmitter is activated to the moment the tone telegram is transmitted.



,PRE = S The preamble time is standard as defined by the default tone system.

,PRE = <value in milliseconds>

Non-standard preamble time defined by the radio system. The specified time (in 10 millisecond steps) will be used as default value for the individual tone telegrams if the individual ,PRE = S.

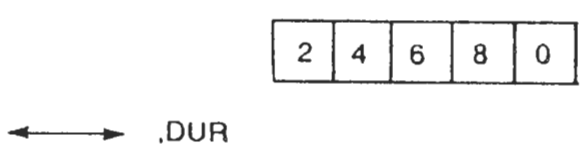
PRE = N No preamble time.

8.1.2. DURATION

,DUR = {S/10 . . . 2540}

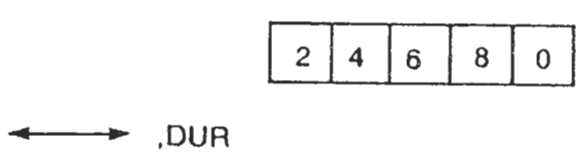
The ,DUR = subfunction defines the duration of the first tone in a telegram.

,DUR = S defines all tones in the telegram to have the same duration as specified by the default tone system.



,DUR = <value in milliseconds>

Duration of the first tone in a transmitted telegram will be equal to the defined value (in 10 millisecond steps) and will be used as default value for the individual ,DUR = S



Only the first tone duration will be affected keeping the standard duration for the remaining tones in the telegram.

8.1.3. DTMF-MODE ENABLE

,DTM = {Y/N} Default = N

The DTMF (Dual Tone Multi-Frequency) mode is used, and hence enabled when the radio should be operated in a radio system with private telephone exchange (PABX) interconnection.

,DTM = N DTMF-mode disabled
,DTM = Y DTMF-mode enabled

8.1.4. PAUSE

,PAU = {1 . . 15} Default = 3

The ,PAU = subfunction is required only if the DTM = Y and defines the time of a pause in DTMF signalling.

The pause value is stated in seconds and legal range is 1 to 15.

8.1.5. GROUP DIGIT

GRP = {N/O . . . F} Default = N

When designing a group call scheme for the system, you start by assigning a group digit to GRP. e.g. GRP = A. You may assign another digit if you like, e.g. GRP = 0. If this is the case, the digit "0" is reserved for group calls and will not make sense if used for other purposes. The group digit is used both for decoding and encoding group calls.

Next, you decide into which position in the decoder telegram ,POS = the group tone is to be inserted. For illustration, consider the three examples given below.

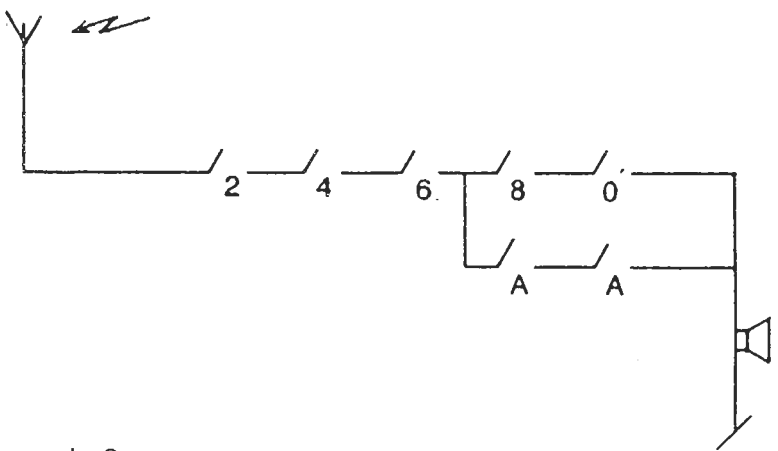
Example 1:

Suppose we write:

DEC = 2.4.6.8.0

GRP = A

,POS = 4



Loudspeaker will open upon receiving:

2 4 6 8 0

2 4 6 A A

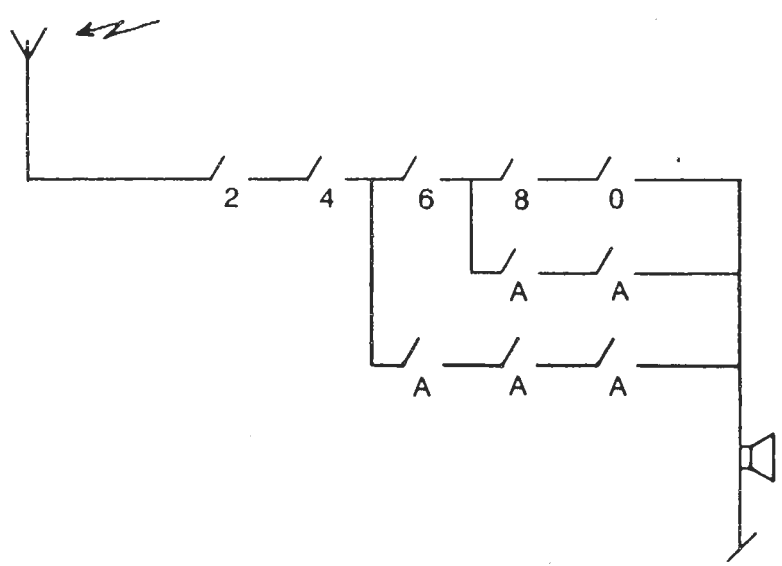
Example 2:

Suppose we write:

DEC = 2.4.6.8.0

GRP = A

,POS = 3.4



Loudspeaker will open upon receiving:

2 4 6 8 0

2 4 6 A A

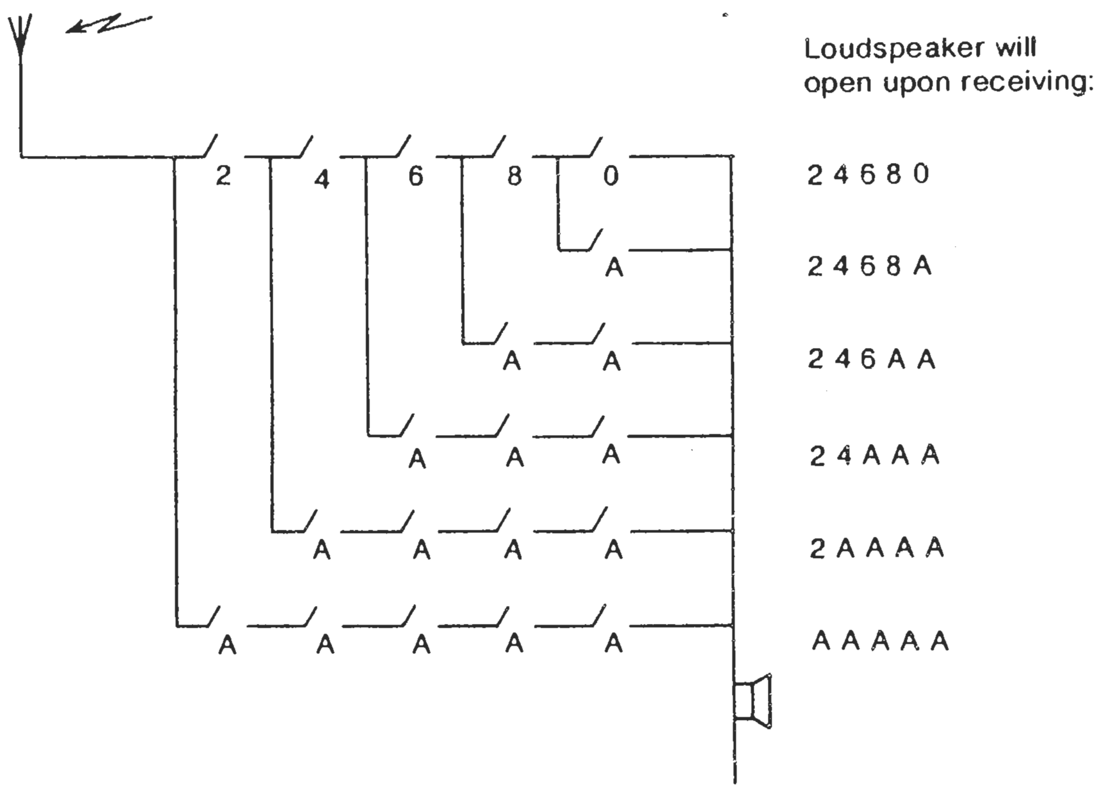
2 4 A A A

8.1.6. POSITION OF GROUP DIGIT

,POS = {N/1 . . . 8} Default = N

The ,POS = defines the positions in which the telegram decoder accepts group tones and responds accordingly.

,POS = N Group tone accepted in all positions (hierarchical group call).



You write:

DEC	=	2.4.6.8.0
GRP	=	A
,POS	=	N

POS = {position(s)}

The positions of the group tone must be entered as a string of digit between 1 and 7 (without periods or spaces).

Example: Group call on position 3 and 4 and 5.

,POS = 345

8.1.7. BREAK DOWN TIME

,BDT = {N/0 . . . 254} Default = 3

The ,BDT = subfunction defines the break down time for a group call. The time specified is the time from carrier disappearance till loudspeaker switch off.

,BDT = N No break down, timer disabled.

,BDT = value 0 - 254 seconds, as specified, break down time.

8.2. SEQUENTIAL TONE ENCODER TELEGRAMS

The Stornophone 6000 EF Software package is designed to support radio systems in which several telegrams may be used for different purposes.

The encoder telegrams are:

ENC =	1. encoder telegram
SNC =	2. encoder telegram
TNC =	3. encoder telegram
TOF =	Transmit on first PTT telegram
TOE =	Transmit on every PTT telegram
AC1 =	Acknowledge telegram for decoder
AC2 =	Acknowledge telegram for parallel decoder
AC3 =	Acknowledge telegram for Clear Down decoder
HUT =	Hang-up telegram

```
CQM6000: Software EF-R5.0    EF Field Programmer.  << Input:   SPS=0 >>
-------------------------------------------------------------------------
Signal-Digits      (TX - Telegrams)              TON PRE  DUR   FOL PRE  DUR

ENC=1  2  3  4  5  N                             S   S    S     TTF S    S
SNC=5  4  5  6  0  N                             S   S    S     TTF S    S
TNC=6  0  0  0  N                                S   S    S     TTF S    S
TOF=N
TOE=N

AC1=1  2  3  4  5  N                             S   S    S     TTF S    S
AC2=2  3  4  5  6  N                             S   S    S     TTF S    S
AC3=5  6  7  8  0  N                             S   S    S     TTF S    S
ACT= 0.15
HUT=1  2  3  4  5  N                             S   S    S     TTF S    S
BYE=N
STF=6  6  0  0  3  N                             S   S    S
TTF=5  6  7  2  5  N                             S   S    S

-------------------------------------------------------------------------
ok?   (Yes/No/Menu)
```

8.2.1. GENERAL ENCODER SYSTEM

8.2.1.1. Telegram size

All telegrams can contain up to 7 positions. If a single telegram cannot accomodate the requested information, you can append extra telegrams using the second and/or third telegram format STF = and TTF = .

8.2.1.2. Telegram specification

A telegram can be defined in two ways:

a string of telegram tones which **must** be separated by [ENTER] and where each position is occupied by:

either a fixed digit:
0 1 2 3 4 5 6 7 8 9 A B C D E X

or a reference to a digit in the display
1A 2A 3A 4A 5A 6A 7A 1S 2S

or a reference to a digit in the codeplug:
C01 C02 C03 C04 C05 C06 C07 C08 C09 C10 C11 C12 C13 C14
C15 C16 C17 C18 C19 C20 C21 C22 C23 C24 C25 C26 C27 C28

Example: ENC = 1.1A.5.1S.C01

Note:
The EF Software nomenclature accepts only that 7 tones are being defined for a telegram. The EF personality program, however, allows up to 15 tones in one telegram, but this will limit the total number of telegrams in one radio.

8.2.1.3. Codeplug reference digits

A codeplug reference digit is a pointer to a digit located in the codeplug. The codeplug may contain up to 28 digits denoted C01 to C28 in the nomenclature.

Example:

Radio: ENC = 2.4.C01.C02.C03.

Codeplug: C01 = 1

C02 = 2

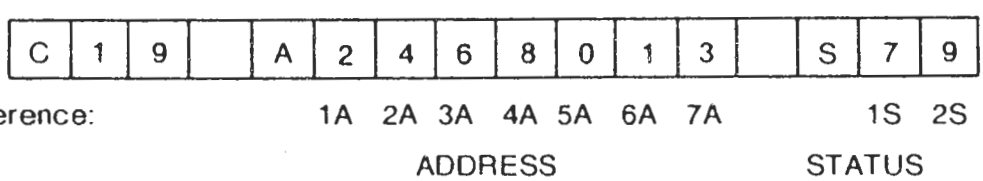
C03 = 3

When the codeplug is inserted in the radio, the encoder code will be:

2.4.1.2.3

8.2.1.4. Display reference digits

The references indicate the position in the display as shown below.



8.2.1.5. Encoders and display reference digits

An encoder will always read a reference digit as: "Take the value in the display" - and then transmit it.

Example:

You have written: ENC = 1A.2A.3A.1S.2S in the software specification and the display is as shown above. The radio will then transmit the telegram corresponding to the string 2.4.6.7.9 when the [♪] button is pushed.

8.2.1.6. Functional telegrams

The CQM 6000 EF Software includes nine functional telegrams. Such a telegram is transmitted after one of the following actions or events:

Action/event:	Telegram:
Pushing the [♪] button	ENC
Pushing the [A] button	SNC
Pushing the external emergency button	TNC
Pushing the PTT button with loudspeaker off	TOF
Pushing the PTT button	TOE
Decoding DEC	AC1
Decoding PDE	AC2
Decoding CLD	AC3
Placing the handset in the retainer or closing the loudspeaker manually	HUT

8.2.1.7. Third encoder (TNC) - Emergency procedure

The third encoder telegram is released from the 25 pin connector on the rear side of the radio. When it is released, the emergency procedure is carried out according to the ZVEI recommendation.

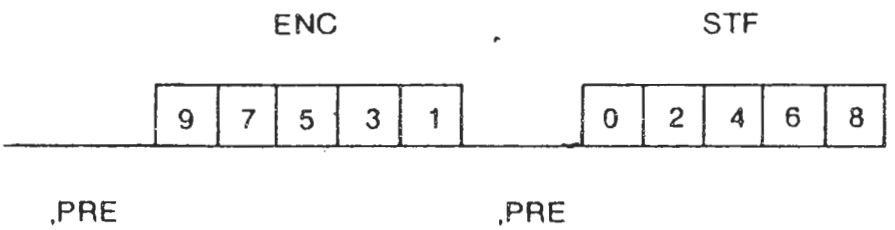
8.2.1.8. Auxiliary telegrams

Auxiliary telegrams are telegrams which can be appended to a functional telegram. Note that auxiliary telegrams cannot "leave the house unless accompanied by a parent", i.e. a functional telegram.

SEQUENTIAL TONE SYSTEMS

Two telegrams, denoted by the identifiers STF and TTF are available.

Examples:



This sequence is assigned when writing:

ENC = 9.7.5.3.1
,FOL = STF
:
:
STF = 0.2.4.6.8

Defining an encoder telegram, no matter which one follows the same procedure with respect to data input and syntax for which reason only the ENC = and its associated subfunctions are explained.

8.2.2. ENCODER DATA INPUT

8.2.2.1. Encoder

ENC = {telegram digits/N} Default = N

Type the telegram digits or reference to a display position or codeplug digt as follows:

1. digit [ENTER] 2. digit [ENTER] . . . . . .N [ENTER]

The field in which the cursor is positioned always contains the letter **N**. When no more digits should be defined press [ENTER] . (N = no more tones).

The encoder telegram (ENC) is released when the [♪] button is pressed and the TKA = criteria is fulfilled.

Example: ENC = 1.2.1A.2A.3A

```
CQM6000: Software EF-R5.0    EF Field Programmer.  << Input:   SPS=0 >>
-------------------------------------------------------------------------
Signal-Digits      (TX - Telegrams)              TON PRE  DUR   FOL PRE  DUR

ENC=1  2  3  4  5  N
```

```
   <Enter>
```

8.2.2.2. Tone system (used by ENC)

,TON = {S/system} Default = N

The ,TON = subfunction of a telegram may be used to specify another tone system than that defined as default by function TON = .

,TON = S — Standard default tone system

,TON = system — Tone system different to default system. The options are: ZV1/ZV2/ZV3/CCI/EEA/VDE/BZV/BEE

8.2.2.3. Preamble time (used by ENC)

,PRE = {S/N/10 . . .2540} Default = S

The ,PRE = subfunction of a telegram may be used to specify a preamble time different to that specified by default function PRE = .

,PRE = S Standard preamble as defined by function PRE = .

,PRE = N No preamble

,PRE = <milliseconds>
User defined preamble, valid range 10 - 2540 milliseconds. The data input must be an integer and in steps of 10 milliseconds.

8.2.2.4. Duration of 1. tone (used by ENC)

,DUR = {S/N/10 . . . 2540} Default = S

The ,DUR = subfunction of a telegram may be used to specify a duration of the first tone in the telegram to be different to that specified by default, function DUR = .

,DUR = S Standard duration as defined by function DUR = .

,DUR = N No duration

,DUR = <milliseconds>
User defined duration, valid range 10 - 2540 milliseconds. The data input must be an integer and in steps of 10 milliseconds.

8.2.2.5. Following telegram

,FOL = {STF/TTF/N} Default = N

All encoder telegrams may be followed by an auxillary telegram format which must be defined by functions STF = and TTF = .

```
CQM6000: Software EF-R5.0    EF Field Programmer.  << Input:   SPS=0 >>
-------------------------------------------------------------------------
Signal-Digits      (TX - Telegrams)              TON PRE  DUR   FOL PRE  DUR

ENC=1  2  3  4  5  N                             S   S    S     STF
```

```
-------------------------------------------------------------------------
Syntax: N^STF^TTF^  Default: N
```

The ,FOL = and the associated ,PRE = and ,DUR = subfunctions are entered on the same line as the encoder. Two telegrams (STF and TTF) may be appended to an encoder.

The input is as follows:

ENC = {telegram}
,TON = {signalling system}
,PRE = {preamble}
,DUR = {duration}
,FOL = {1. following telegram (STF or TTF - N = No)}
,PRE = {preamble of 1. FOL = }
,DUR = {duration of 1. FOL = }
,FOL = {2. following telegram (STF or TTF - N = No)}
,PRE = {preamble of 2. FOL = }
,DUR = {duration of 2. FOL = }

First time the cursor is placed in the FOL field the first following telegram may be entered, and if FOL = N the rest of the input for this encoder is skipped. If a telegram format is entered (STF or TTF) then the associated ,PRE = and ,DUR = must be defined. The cursor then again is placed in the FOL field for new input and this time the last following telegram format may be entered. The input of a telegram format requires input of the associated PRE and DUR and FOL = N proceeds to the next encoder.

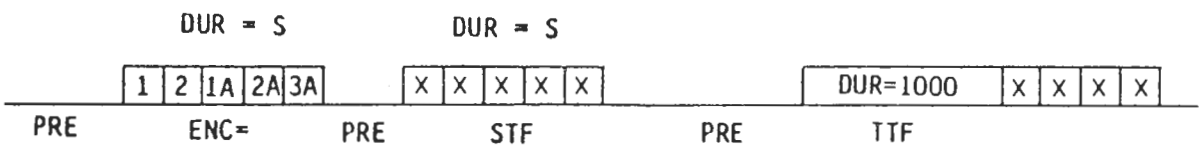
```
CQM6000: Software EF-R5.0    EF Field Programmer.  << Input:   SPS=0 >>
-------------------------------------------------------------------------
Signal-Digits      (TX - Telegrams)              TON PRE  DUR   FOL PRE  DUR

ENC=1  2  3  4  5  N                             S   S    S     TTF S    S

Example:
ENC=1.2.3.4.5
   ,TON = S   ,PRE = S   ,DUR = S
   ,FOL = TTF  ,PRE = S   ,DUR = S
```

Syntax: N^STF^TTF^ Default: N

```
CQM6000: Software EF-R5.0    EF Field Programmer.  << Input:   SPS=0 >>
-------------------------------------------------------------------------
Signal-Digits      (TX - Telegrams)              TON PRE  DUR   FOL PRE  DUR

ENC=1  2  3  4  5  N                             S   S    S     TTF 1000 1000
```

```
Example:
ENC=1.2.3.4.5
   ,TON = S   ,PRE = S   ,DUR = S
   ,FOL = STF   ,PRE = S   ,DUR = S
   ,FOL = TTF   ,PRE = 1000   ,DUR = 1000
```

The complete telegram:




```
-------------------------------------------------------------------------
Syntax: N^STF^TTF^  Default: N
```

The ,PRE = and ,DUR = subfunction values and their syntax are identical to PRE and DUR described for the main function.

8.2.3. SECOND ENCODER

SNC = {telegram digits/N} Default = N

Second encoder telegram and its associated subfunctions are specified as described for ENC = .

The second encoder telegram is, if used, released by pressing the [A] button and the SKA = criteria is fulfilled.

8.2.4. THIRD ENCODER

TNC = {telegram digits/N} Default = N

Third encoder telegram and its associated subfunctions are specified as described for ENC = .
The third encoder telegram is, if used, released by activating an external emergency call button and the TKA = criteria is fulfilled.

8.2.5. TRANSMIT ON FIRST PTT

TOF = {telegram digits/N} Default = N

The TOF = telegram and its associated subfunctions are specified as described for ENC = .
The telegram is released the first time the PTT button is activated after switching the loudspeaker on and the PTA = criteria is fulfilled.

8.2.6. TRANSMIT ON EVERY PTT

TOE = {telegram digits/N} Default = N

The TOE = telegram and its associated subfunctions are specified as described for ENC = .
The telegram is released every time the PTT button is activated during a conversation.

8.2.7. IDENTIFICATION TIMER

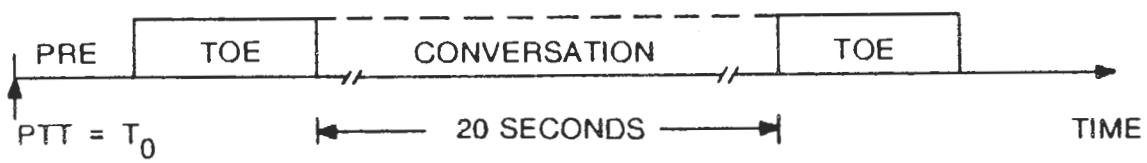
IDT = {N/1...254} Default = N

The identification timer defines the telegram specified by TOE = to be transmitted at regular intervals for identification when the PTT button is being depressed. The time is specified in seconds and legal range is 1-254.

,IDT = N No identification

,IDT = value in seconds

Example: TOE = 1 - 2 - 3 - 4 - 5 ,IDT = 20




```
CQM6000: Software EF-R5.0    EF Field Programmer.  << Input:   SPS=0 >>
-------------------------------------------------------------------------------
Signal-Digits       (TX - Telegrams)              TON PRE  DUR   FOL PRE  DUR

ENC=1  2  3  4  5  N                              S   S    S     TTF S    S
SNC=5  4  5  6  0  N                              S   S    S     TTF S    S
TNC=6  0  0  0  N                                 S   S    S     TTF S    S
TOF=N
TOE=1  2  3  4  5  N                              S   S    S     STF S    S
,IDT=20
```

```
Example:
   TOR=1.2.3.4.5   ,TON = S   ,PRE = S   ,DUR = S
   ,FOL = STF   ,PRE = S   ,DUR = S
   ,IDT = 20
```

```
-------------------------------------------------------------------------------
Syntax:          1 ..        254,  N  Default: N
```

8.2.8. ACKNOWLEDGE FOR DECODER

AC1 = {telegram digits/N} Default = N

The AC1 = telegram and its associated subfunctions are specified as described for ENC =. The telegram is released when the radio's decoder detects a matching individual call.

8.2.9. ACKNOWLEDGE FOR PARALLEL DECODER

AC2 = {telegram digits/N} Default = N

The AC2 = telegram and its associated subfunctions are specified as described for ENC =. The telegram is released when the radio's parallel decoder (PDE) detects a matching call.

8.2.10. ACKNOWLEDGE FOR CLEAR DOWN DECODER

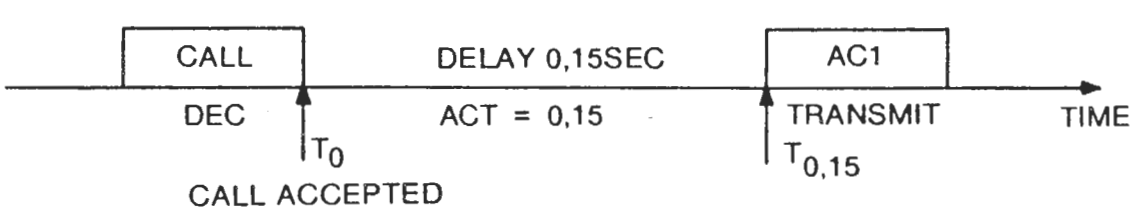
AC3 = {telegram digits/N} Default = N

The AC3 = telegram and its associated subfunctions are specified as described for ENC =. The telegram is released when the radio's clear down decoder detects a matching call.

8.2.11. ACKNOWLEDGE TIMER

ACT = {0...2.5} Default = 0.15

The acknowledge timer defines the delay in seconds (0.01 sec. step) from a call has been detected till the corresponding acknowledge telegram is transmitted. Legal range is 0 - 2.5 seconds.

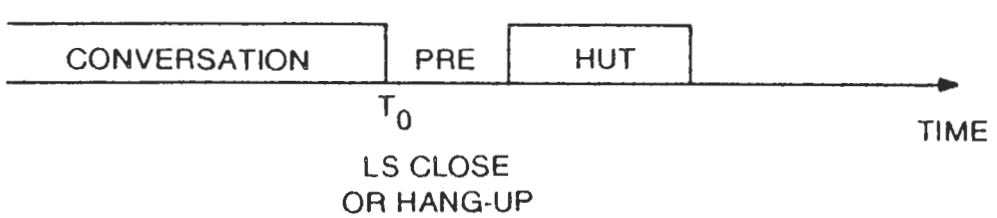


```
CQM6000: Software EF-R5.0    EF Field Programmer.  << Input:   SPS=0 >>
-------------------------------------------------------------------------------
Signal-Digits      (TX - Telegrams)                TON PRE  DUR   FOL PRE  DUR

ENC=1  2  3  4  5  N                               S   S    S     TTF S    S
SNC=5  4  5  6  0  N                               S   S    S     TTF S    S
TNC=6  0  0  0  N                                  S   S    S     TTF S    S
TOF=N
TOE=1  2  3  4  5  N                               S   S    S     STF S    S
,IDT=20
AC1=1  2  3  4  5  N                               S   S    S     TTF S    S
AC2=2  3  4  5  6  N                               S   S    S     TTF S    S
AC3=5  6  7  8  0  N                               S   S    S     TTF S    S
ACT= 0.15

-------------------------------------------------------------------------------
Syntax:          0 ..          2.5    Default: 0.15
```

8.2.12. HANG-UP TELEGRAM

HUT = {telegram digits/N} Default = N

The HUT = telegram and its associated subfunctions are specified as described for ENC =. The telegram is released when the operator terminates a conversation and closes the loudspeaker or places the handset, if used, in the retainer.



8.2.12.1. Second telegram format

STF = {telegram digits/N} Default = N

The second telegram format is an auxiliary telegram which can be appended to a functional telegram. The STF telegram is then assigned as FOL = STF to the wanted telegram and may be using its own tone system, preamble and duration specified by its associated ,TON = ,PRE = , and ,DUR = subfunctions.

8.2.12.2. Third telegram format

TTF = {telegram digits/N} Default = N

The third telegram format is an auxillary telegram which can be appended to a functional telegram. The TTF is then assigned as FOL = TTF to the wanted telegram and may be using its own tone system, preamble and duration specified by its associated ,TON = ,PRE = ,DUR = subfunctions.

```
CQM6000: Software EF-R5.0    EF Field Programmer.  << Input:   SPS=0 >>
-------------------------------------------------------------------------
Signal-Digits      (TX - Telegrams)                TON PRE  DUR   FOL PRE  DUR

ENC=1  2  3  4  5  N                               S   S    S     TTF S    S
SNC=5  4  5  6  0  N                               S   S    S     TTF S    S
TNC=6  0  0  0  N                                  S   S    S     TTF S    S
TOF=N
TOE=1  2  3  4  5  N                               S   S    S     STF S    S
,IDT=20
AC1=1  2  3  4  5  N                               S   S    S     TTF S    S
AC2=2  3  4  5  6  N                               S   S    S     TTF S    S
AC3=5  6  7  8  0  N                               S   S    S     TTF S    S
ACT= 0.15
HUT=1  2  3  4  5  N                               S   S    S     TTF S    S
BYE=N
STF=6  1S 2S 0  3  N                               S   S    S
TTF=5  1A 2A 3A 4A N                               CCI 200  1000


-------------------------------------------------------------------------
ok?   (Yes/No/Menu)
```

Example:

ENC = 1.2.1A.2A.3A, TON = S , PRE = S , DUR = S

,FOL = STF , PRE = S , DUR = S

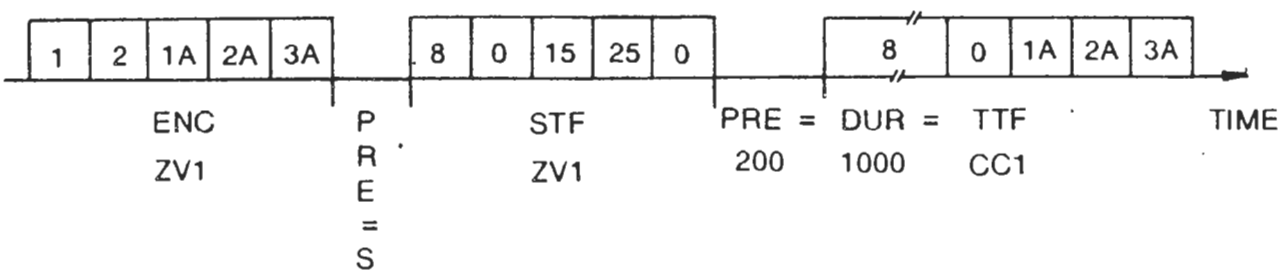
,FOL = TTF , PRE = S , DUR = S

STF = 8.0.1S.2S.0 , TON = S , PRE = S , DUR = S

TTF = 8.0.1A.2A.3A , TON = CCI , PRE = 200 , DUR = 1000

Default tone system TON = ZV1

TRANSMITTED TELEGRAM:



8.3. SEQUENTIAL TONE DECODER TELEGRAMS

8.3.1. GENERAL DECODER SYSTEM

8.3.1.1. Decoder telegrams

A decoder telegram is a telegram which can be decoded ("understood") by the radio. The CQM6000 EF Software comprises four decoder telegrams:

DEC =	Ordinary tone decoder
PDE =	Parallel tone decoder
CLD =	Clear down decoder
ADE =	Acknowledge telegram decoder

8.3.1.2. Decoder and display reference digits

Display reference digits must only be used if SPS = 0.

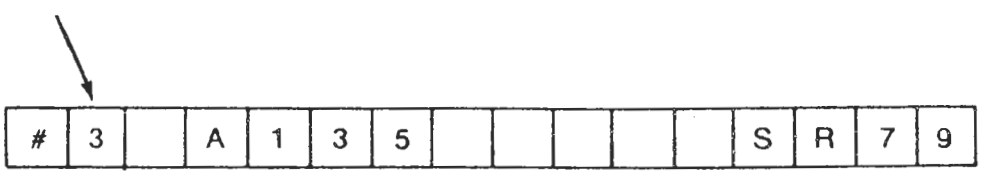
A decoder will always read a reference digit as:

"Write the value in the display."

Example:

You have written: SDE = 1A.2A.3A.1S.2S in the software specification and the second telegram received is 1.3.5.7.9. The queue display will then be as shown here:

Queue number



Reference: 1A 2A 3A 1S 2S

8.3.1.3. Don't-care-digits in decoders

If a certain position in a received telegram is not going to be used, you can write X in this position when defining the decoder. The decoder will then "close the switch" provided that the tone frequency and the duration is as specified in the tone system.

Example: DEC = 2.4.X.8.0

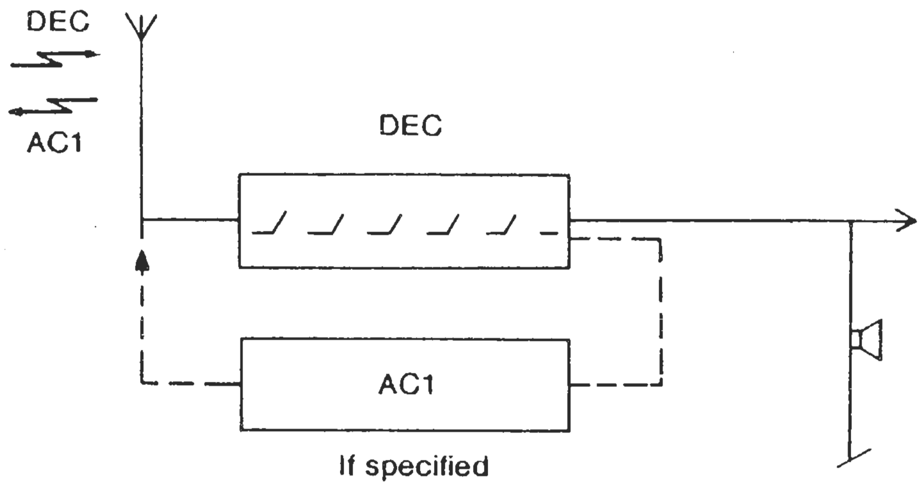
The radio will then open upon receiving 2.4.0.8.0 or 2.4.1.8.0 or 2.4.2.8.0 etc.

8.3.2. DECODER DATA INPUT

8.3.2.1. Decoder

DEC = {telegram digits/N} Default = N

The DEC is the mobile radio's identity in the system; i.e. the "telephone number" of the radio as seen from the system's point of view. (But not necessarily from the users' point of view). The acknowledge for DEC is the AC1 telegrams.




```
CQM6000: Software EF-R5.0    EF Field Programmer.  << Input:  SPS=0 >>
--------------------------------------------------------------------------
Signal-Digits    (RX - Telegrams)                                FOL

DEC=8 , 3 , 4 , 5 , 6 , N                                         SDE
                          <Enter>                      <Enter>

Example:
DEC=8.3.X.2.3     ,FOL = SDE {optional  ,FOL = SDE/N}
```

```
--------------------------------------------------------------------------
Syntax: N^SDE^  Default: N
```

DEC = N No decoder

DEC = {telegram digits}

Fixed tone digits

0 - 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - A - B - C - D - E

Reference to address digits

x A X = address digit in the display (1-7)

Reference to status digits

x S X = status digit in the display (1-2)

Reference to code plug digits

C x X = code plug digit (1-28)

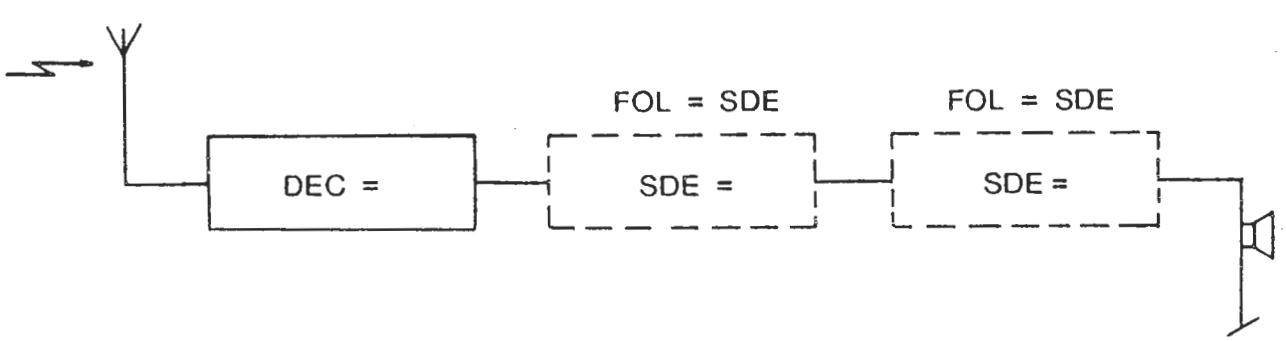
Reference to identification digits

x D X = ID-digit

8.3.2.2. Decoder follow telegram

,FOL = {SDE/N} ,FOL = {SDE/N}

The decoder may be followed by a serial decoder SDE which may be specified by enterir SDE in the FOL field. If FOL = SDE then the cursor again is placed in the FOL field for a second follow decoder which may be selected by entering SDE.

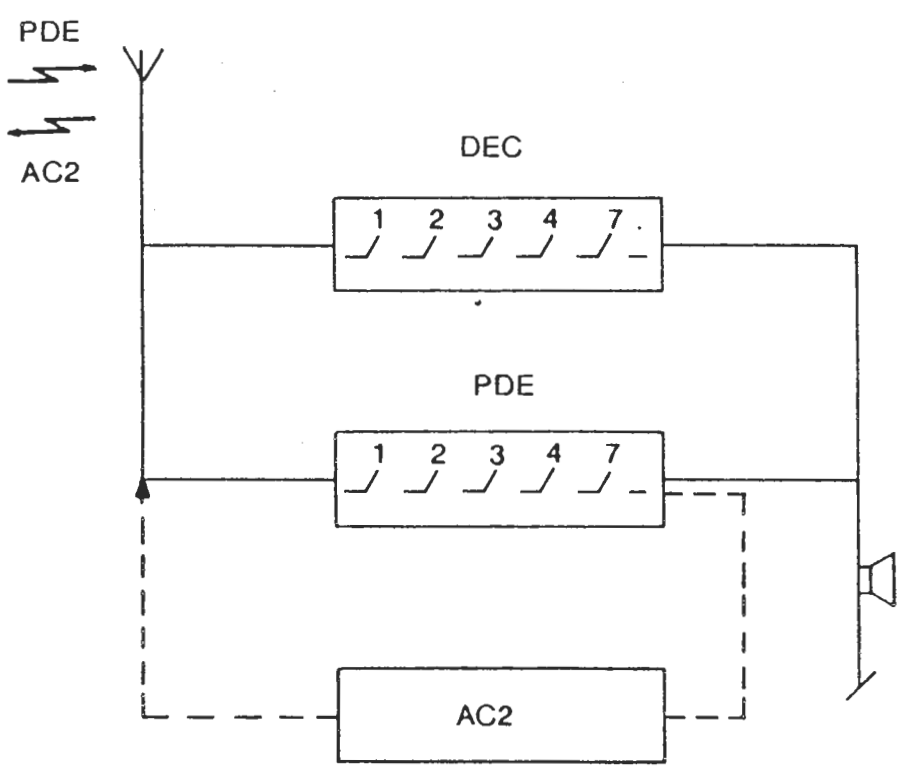


Note:
If FOL = SDE then SDE = MUST be defined or an error will occur during calculaton of prom data.

8.3.3. PARALLEL DECODER

PDE = {telegram digits/N} Default = N

The PDE is an alternative decoder (placed in parallel to the normal decoder, DEC) which makes it possible for the mobile station to have an additional identity, e.g. in the codeplug.
The acknowledge for PDE is the AC2 telegram.

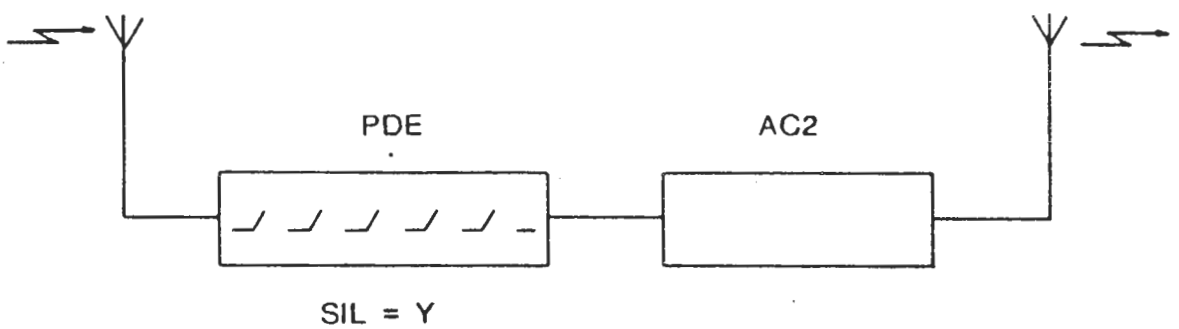


The PDE = telegram digits and its associated subfunctions.
FOL = are specified as described for the decoder DEC = .

8.3.3.1. Silent interrogate

,SIL = {Y/N} Default = N

The ,SIL is a special function which makes it possible for the base station to request a status telegram (AC2) from the mobile station without opening the loudspeaker and initating the normal alert signal.



If SIL = Y is specified the program requires that AC2 = telegram is also defined. Otherwise the an error occurs during prom data calculation.

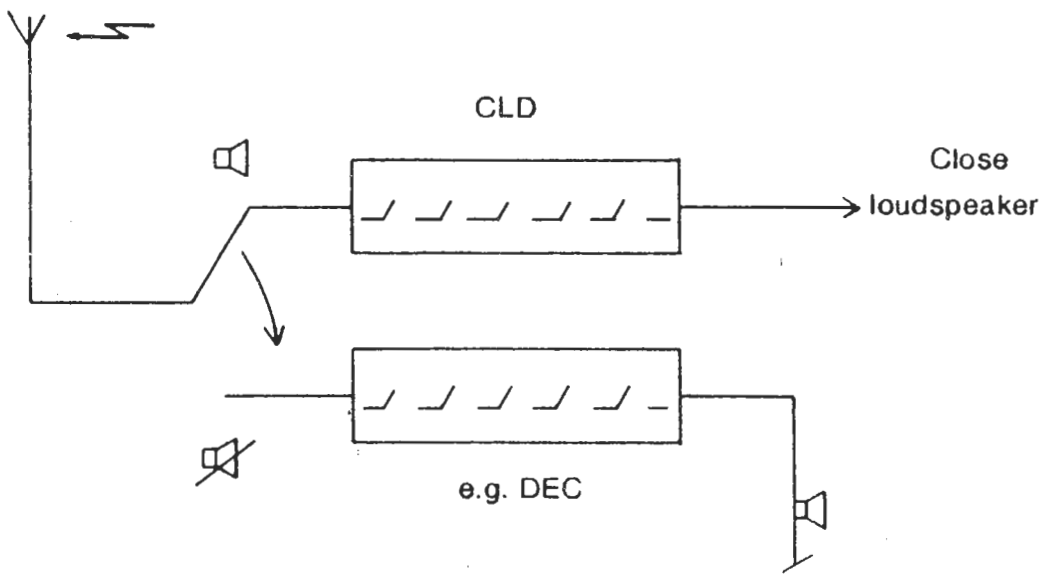
```
CQM6000: Software EF-R5.0    EF Field Programmer.  << Input:  SPS=0 >>
-------------------------------------------------------------------------------
Signal-Digits    (RX - Telegrams)                                    FOL

DEC=8  3  4  5  6  N                                                 SDE
PDE=4  5  0  0  1  N                                                 SDE
,SIL=N
```

```
-------------------------------------------------------------------------------
Syntax: Y^N^  Default: N
```

8.3.4. CLEAR DOWN DECODER

CLD = {telegram digits/N} Default = N

The CLD is a special decoder which is used in systems where you want active clear-down of a conversation. Acknowledge for CLD is the AC3 telegram.



The CLD = telegram is specified as described for DEC = .

```
CQM6000: Software EF-R5.0    EF Field Programmer.  << Input:  SPS=0 >>
-------------------------------------------------------------------------
Signal-Digits     (RX - Telegrams)                                  FOL

DEC=8  3  4  5  6  N                                               SDE
PDE=4  5  0  0  1  N                                               SDE
,SIL=N
CLD=5  5  9  0  0  N
```

8.3.5. ACKNOWLEDGE DECODER

ADE = {telegram digits/N} Default = N

ADE is decoder which becomes alive upon transmitting a telegram requesting an acknowledgement specified under ,ACE. If an acknowledgement is not received within the limit assigned to ,RTI the requesting telegram will be retransmitted. This cycle will repeat itself until either an acknowledgement is received or the number of cycles becomes equal to the value assigned to ,REP.

When ADE is specified, the loudspeaker will first open upon reception of the telegram specified under ADE.

The ADE = telegram is specified as described for DEC = .

When ADE = is used ACE = , RTI = and REP = must be defined.

```
CQM6000: Software EF-R5.0    EF Field Programmer.  << Input:  SPS=0 >>
-------------------------------------------------------------------------------
Signal-Digits    (RX - Telegrams)                                      FOL

DEC=8  3  4  5  6  N                                                  SDE
PDE=4  5  0  0  1  N                                                  SDE
,SIL=N
CLD=5  5  9  0  0  N                                                  N
ADE=5  4  3  0  1  N
```

8.3.5.1. Acknowledge expected selector

, ACE = {1/2/3/4/5/6/N} Default = N

The ,ACE = subfunction defines on which telegram(s) the acknowledge decoder should be active and expect an acknowledge telegram to be returned by the called station.
The program accept that one or several encoder telegrams are specified.

ACE = 1	Acknowledge expected on	ENC = telegram
ACE = 2	Acknowledge expected on	SNC = telegram
ACE = 3	Acknowledge expected on	TNC = telegram
ACE = 4	Acknowledge expected on	TOF = telegram
ACE = 5	Acknowledge expected on	TOE = telegram
ACE = 6	Acknowledge expected on	HUT = telegram
ACE = N	Acknowledge not expected (ADE = N)	

Example: Acknowledge telegram expected upon transmission of ENC, SNC and HUT.
Input: ,ACE = 126

Note: All telegram to which the ACE is referring must be defined using the appropriate function.

```
CQM6000: Software EF-R5.0    EF Field Programmer.  << Input:  SPS=0 >>
-------------------------------------------------------------------------
Signal-Digits    (RX - Telegrams)                                   FOL

DEC=8  3  4  5  6  N                                               SDE
PDE=4  5  0  0  1  N                                               SDE
,SIL=N
CLD=5  5  9  0  0  N                                               N
ADE=5  4  3  0  1  N                                               N
,ACE=126
```

8.3.5.2. Repetitions

,REP = {0 - 15} Default = 0

The REP = subfunction defines the number of retry transmission of the telegram(s) which has been defined under ACE =. The radio always transmits the telegram once and then, if no acknowledge is received, retries at intervals defined by RTI = until acknowledge is either received or the number as defined by REP is reached.

8.3.5.3. Repetition time

,RTI = {0 - 25.4} Default = 1

The RTI = subfunctions defines the interval between retry transmissions as defined by REP.

The time is specified in seconds, legal range being 0 - 25.4 seconds in 0.1 sec. steps. The minimum time that can be specified must be at least PRE + DUR + length of the expected telegram to be received.

Example: The radio which should acknowledge a transmitted telegram by transmitting an acknowledge signal has been

coded: PRE = 7 ms DUR = 70 ms
Tone telegram 5 tones each 70 ms

Minimum: RTI = 70 + 70 + (5 x 70) = 490 ms
,RTI = 0,5 - 25.4 (seconds)

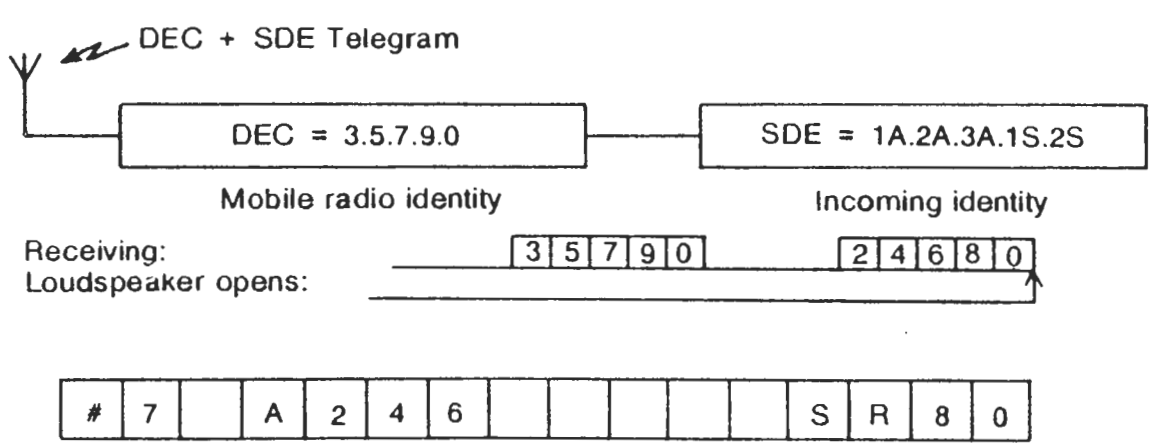
```
CQM6000: Software EF-R5.0    EF Field Programmer.  << Input:  SPS=0 >>
-------------------------------------------------------------------------
Signal-Digits    (RX - Telegrams)                                   FOL

DEC=8  3  4  5  6  N                                               SDE
PDE=4  5  0  0  1  N                                               SDE
,SIL=N
CLD=5  5  9  0  0  N                                               N
ADE=5  4  3  0  1  N                                               N
,ACE=126
,REP=5
,RTI=1.0

-------------------------------------------------------------------------
Syntax:          0 ..          25,    Default: 1
```

8.3.5.4. Serial decoder

SDE = {telegram digits/N} Default = N

The auxiliary decoder telegram is specified by function SDE. It must always be appended to a decoder telegram. (,FOL = SDE).
Normally it is used for queue handling as shown in the following example:

DEC + SDE telegram



Ordered as:

```
DEC      =   3.5.7.9.0
  ,FOL   =   SDE
             :
             :
SDE      =   1A.2A.3A.1S.2S
```

```
CQM6000: Software EF-R5.0    EF Field Programmer.  << Input:  SPS=0 >>
-------------------------------------------------------------------------
Signal-Digits    (RX - Telegrams)                                   FOL

DEC=8  3  4  5  6  N                                               SDE
PDE=4  5  0  0  1  N                                               SDE
,SIL=N
CLD=5  5  9  0  0  N                                               N
ADE=5  4  3  0  1  N                                               N
,ACE=126
,REP=5
,RTI=1.0

SDE=1A 2A 3A 4A 5A N
```

SECTION 9

BINARY SIGNALLING - ZVEI AND EEA

9. BINARY SIGNALLING - ZVEI AND EEA

The circuit which takes care of binary signalling is an integrated part of the Stornophone 6000. Accordingly, no supplementary hardware modules have to be ordered, and all information concerning the signalling set-up can be stated using the software nomenclature.
Below, the software input is described when specifying the binary ZVEI and EEA signalling set-up of the Stornophone 6000.

The binary signalling system according to ZVEI is assigned by writing:

TON = BZV

Writing: ,BAS = Y will enable the radio to function as a base station.

The binary signalling system according to EEA is assigned by writing:

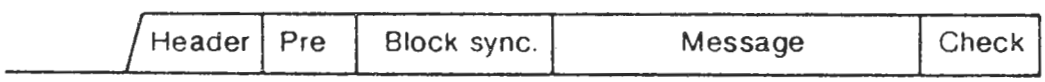
TON = BEE

9.1. BINARY TELEGRAMS

The binary systems differ from sequential tone systems by using only two frequencies, representing the binary digits 0 and 1. The advantage is that binary signalling is 10 times faster than sequential tone signalling.

9.1.1. THE BINARY ZVEI TELEGRAM

A binary ZVEI telegram consists of a string of bits (bit = binary digit), typically 71 bits long. The telegram is divided into five blocks: the Header, the Preamble, the Block Syncronization, the Message, and the Error Check, see ill. 1.



ill. 1: Structure of ZVEI Binary Telegram.

The Preamble, the Syncronization block, and the Error check are fixed bit patterns and cannot be accessed from the nomenclature. Note that the Preamble of binary ZVEI telegrams has nothing to do with the preamble used in sequential tone signalling.

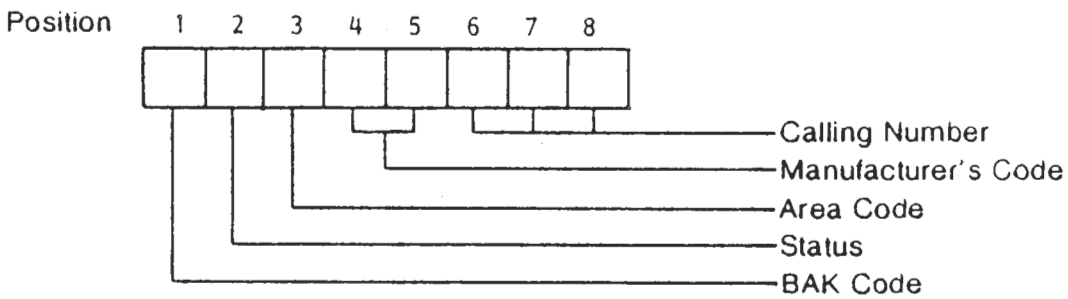
9.1.1.1. The ZVEI header block

The transmission of a binary ZVEI telegram starts with a header, which is an unmodulated carrier gradually changing into a pattern of alternating "0"'s and "1"'s. The header lasts for a period of not less than 25 ms, and the alternating bit string lasts for a period not less than 5.8 ms.If desired, the length of the header can be increased by appending a number of extra alternating bits.

Writing, for example, ,PRE = 2 will add two extra bits at the end, making the total length of the header 26.6 ms.

9.1.1.2. The ZVEI message block

This block contains the "real" information (the message) conveyed by the telegram. This information is represented in the software nomenclature as a string of **exactly** 8 digits, separated by ENTER, where each digit is either a fixed digit or a reference digit. Each position has a fixed meaning according to the ZVEI recommendation, see ill. 2.

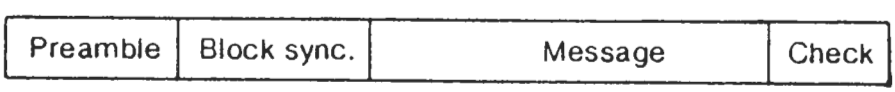


ill. 2: The Message Block.

Description of the ZVEI message block continues in Section 9.2.

9.1.2. THE BINARY EEA TELEGRAM

A binary EEA telegram consists of a string of bits (bit = binary digit), 96 bits long. The telegram is divided into four blocks: The Preamble, the Block Syncronization, the Message, and the Error Check, see ill. 3.



ill. 3: Structure of EEA Binary Telegram

The Block Syncronization and the Error check are fixed bit patterns and cannot be accessed from the nomenclature.

9.1.2.1. The EEA preamble

The transmission of a binary EEA telegram starts with a preamble, which is a string of alternating "0"'s and "1"'s, 16 bits long.

If desired, the length of the Preamble can be increased by appending a number of extra alternating bits.
Writing, for example, ,PRE = 2 will add two extra bits at the end, making the total length of the Preamble 18 bits.

9.1.2.2. The EEA message block

This block contains the "real" information (the message) conveyed by the telegram. This information is represented in the software nomenclature as a string of **exactly** 12 positions, separated by [ENTER], where each position contains either a fixed digit or a reference digit.

Each position has a fixed meaning according to **whether** the telegram is:

- a functional telegram
- a decoder telegram

— See section 9.4.1.4

or

- an auxiliary telegram
- an auxiliary decoder telegram

— See section 9.4.1.4

Description of the EEA message block continues in Section 9.4.

9.2. THE BINARY ZVEI TELEGRAM MESSAGE BLOCK

9.2.1. POSITITIONS

9.2.1.1. Position 1: Bak code

The socalled BAK code is a tag which indicates the current function of the telegram. Since the current function of the remaining telegram depends on the current context in which the remaining telegram is used, we write the capital letter "Z" in the first position, that is

ENC = Z. . . . . .

A "Z" in the first position will instruct the radio to evaluate the current function of a telegram automatically and insert the correct BAK code. For the sake of completeness, we have shown the various BAK codes in the table below.

BAK Code	Telegram type	Remarks
0	At free disposal	
1	Call to Mobile	*)
2	Call to Base	*)
3	Identification	
4	Acknowledge	
5	Following Telegram	
6	Disconnect Command	*)
7	Reserved	
8	Priority Call	*)
9	Status Request	*)
A	Reserved	
B	Reserved	
C	Reserved	
D	At free disposal	
E	At free disposal	
F	Emergency Call	

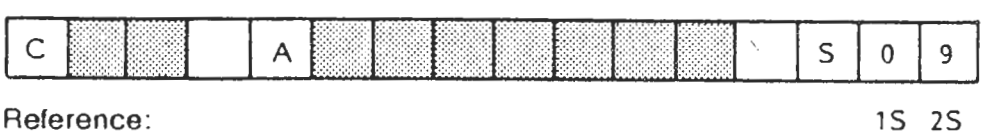
*) Acknowledge required

9.2.1.2. Position 2: Status

The element in position 2 can be assigned as

either a fixed digit:
0/1/2/3/4/5/6/7/8/9/A/B/C/D/E/F/X where "X" is the Don't-care-digit.

or a reference to a digit in the status field in the display (ill. 4):
1S/2S.



ill. 4: Reference digits in status field.

or a reference to a digit in the codeplug:
C01 C02 C03 C04 C05 C06 C07 C08 C09 C10 C11 C12 C13 C14 C15 C16
C17 C18 C19 C20 C21 C22 C23 C24 C25 C26 C27 C28

Examples:

ENC = Z.1. . . . . .

ENC = Z.X. . . . . .

ENC = Z.2S. . . . . .

ENC = Z.C07. . . . . .

9.2.1.3. Position 3: Area code

The Area Code is used to indicate the geographical location of the base station. The position contains one of the values:

0/1/2/3/4/5/6/7/8/9/A/B/C/D/E/F

Example:

ENC = Z.2S.9. . . . .

9.2.1.4. Position 4 and 5: Manufacturer code

These positions are used to indicate the manufacturer's identity. The code is prescribed by the national electronics industries association, e.g.:

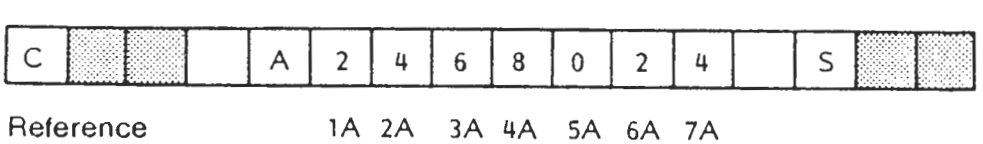
ENC = Z.2S.9.8.8. . .

9.2.1.5. Position 6, 7, and 8: Calling number

The calling number occupies exactly three positions where each position contains:

either a fixed digit, that is, 0/1/2/3/4/5/6/7/8/9/A/B/C/D/E/X where "X" is the Don't-care-digit.

or a reference to a digit in the address field in the display (ill. 5): 1A/2A/3A/4A/5A/6A/7A,



ill. 5: Reference digits in address field

or a reference to a digit in the codeplug:
C01 C02 C03 C04 C05 C06 C07 C08 C09 C10 C11 C12 C13 C14 C15 C16
C17 C18 C19 C20 C21 C22 C23 C24 C25 C26 C27 C28

Examples:

ENC = Z.2S.9.8.8.1.2.3

ENC = Z.2S.9.8.8.X.2.3

ENC = Z.2S.9.8.8.1A.2A.3A

ENC = Z.2S.9.8.8.C01.C02.1A

9.2.2. REFERENCE DIGITS

9.2.2.1. Codeplug reference digits

A codeplug reference digit is a pointer to a digit located in the codeplug. The codeplug may contain up to 28 digits denoted C01 to C28 in the nomenclature.

Example:

Radio:	DEC = Z.X.9.8.8.C01.C02.C03
Codeplug:	C01 = 1
	C02 = 2
	C03 = 3

When the codeplug is inserted in the radio, the decoder code will be:

Z.X.9.8.8.1.2.3

9.2.2.2. Display reference digits

The references indicate the position in the display. The display has two different configurations:

For encoding:

C	1	9		A	2	4	6	8	0	1	3		S	7	9
Reference:					1A	2A	3A	4A	5A	6A	7A			1S	2S

For decoding:

*	3		A	1	3	5						S	R	7	9
Reference:				1A	2A	3A								1S	2S

9.2.2.2.1. Encoders and display reference digits

An encoder will always read a display reference digit as:

"Take the value in the display" - and then transmit it.

Example:

You have written: ENC = Z.1S.9.8.8.1A.2A.3A in the software specification and the display is as shown above. The radio will then transmit the telegram corresponding to the string Z.7.9.8.8.2.4.6 when the [♪] button is pushed.

9.2.2.2.2. Decoders and display reference digits

Display reference digits must only be used if SPS = 0.

A decoder will always read a reference digit as:

"Write the value in the display."

See the example on the next page.

Example:

You have written :

```
DEC          = Z.1S 9.8.8.1.2.8
     ,FOL    = SDE
SDE          = Z.2S.9.8.8.1A.2A.3A
```

in the software specification and the 2 telegrams received are:

The queue display will then be as shown on the previous page (decoding).

9.2.2.3. Don't-care-digits

If a certain position in a telegram is not going to be used, you can write X in this position when defining the telegram. The decoders will then "close the switch" and encoders will transmit four logical zeros. See the table at the end of this section.

9.2.3. TELEGRAM TYPES

The CQM6000 EF Software contains four System Personality Set-up's (SPS) each with up to 16 telegrams which fall into four categories:

- Functional telegrams (9)
- Decoder telegrams (4)
- Auxiliary telegrams (2)
- Auxiliary decoder telegrams (1)

Please note that the total number of telegrams in all SPS's must not exceed 25!

9.2.3.1. Functional telegrams

The CQM6000 EF Software includes nine functional encoder telegrams. Such a telegram is transmitted after one of the following actions or events:

Action/event:	Telegram:
Pushing the [♪] button	ENC
Pushing the [A] button	SNC
Pushing the external emergency button	TNC
Pushing the PTT button with loudspeaker off	TOF
Pushing the PTT button	TOE
Decoding DEC	AC1
Decoding PDE	AC2
Decoding CLD	AC3
Placing the handset in the cradle or closing the loudspeaker manually	HUT

9.2.3.1.1. Third encoder (TNC) - Emergency procedure

The third encoder telegram is released from the 25 pin connector on the rear side of the radio. When it is released, the emergency procedure is carried out according to the ZVEI recommendation.

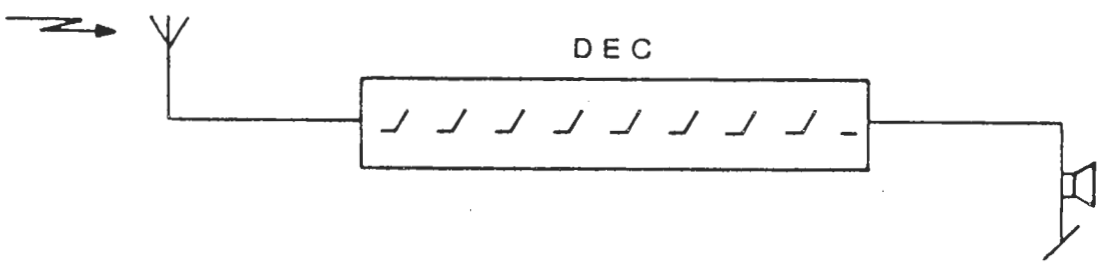
9.2.3.2. Decoder telegrams

A decoder telegram is a telegram which can be decoded ("understood") by the radio. The CQM 6000 EF Software comprises four decoder telegrams:

DEC - PDE - CLD - ADE

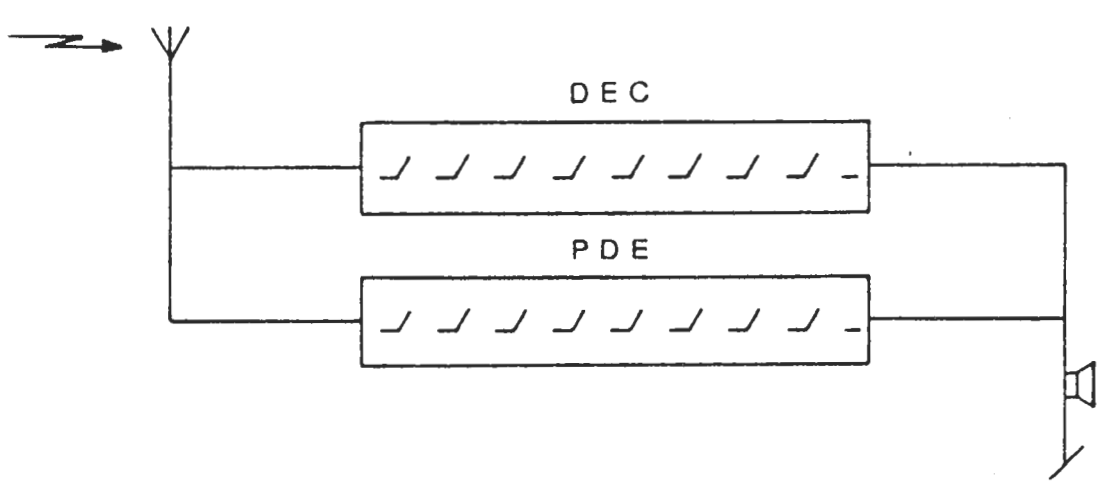
9.2.3.2.1. Decoder (DEC)

The DEC is the mobile radio's identity in the system; i.e the "telephone number" of the radio as seen from the system's point of view. (But not necessarily from the users' points of view). The acknowledge for DEC is the AC1 telegram.



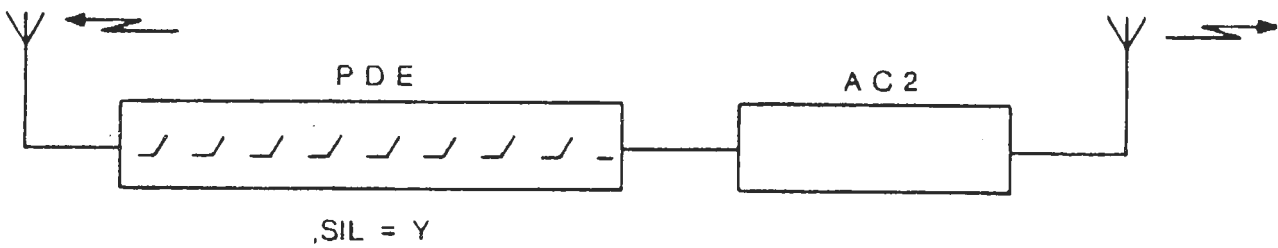
9.2.3.2.2. Parallel decoder (PDE)

The PDE is an alternative decoder (placed in parallel to the normal decoder, DEC) which makes it possible for the radio to have an additional identity, e.g. in the codeplug.
The acknowledge for PDE is the AC2 telegram.



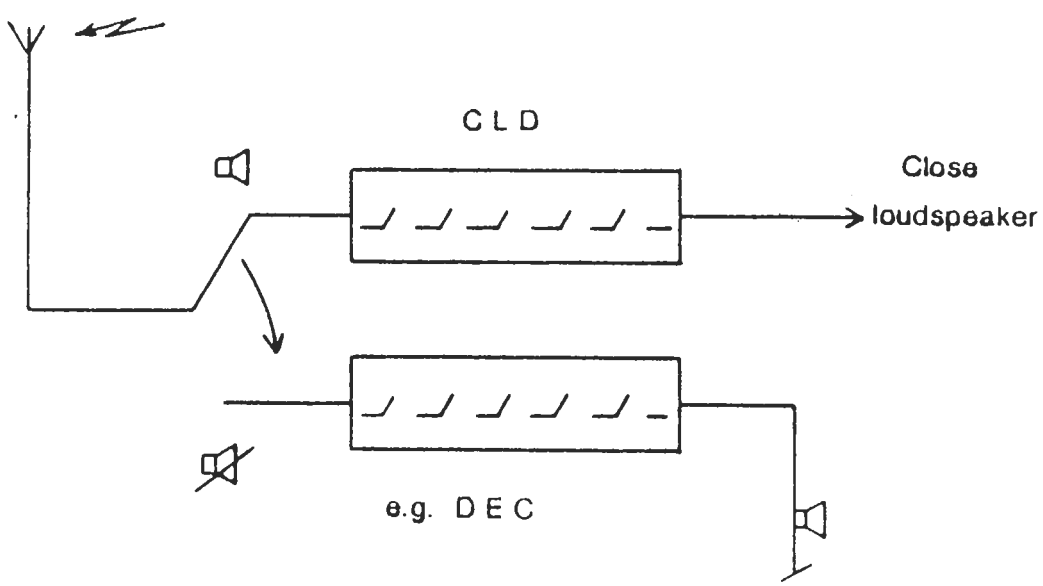
Silent interrogate (,SIL)

The ,SIL is a special function which makes it possible for the base station to request a status telegram (AC2) from the mobile station without opening the loudspeaker and initiating the normal alert signal.



9.2.3.2.3. Clear-down decoder (CLD)

The CLD is a special decoder which is used in systems where you want active clear-down of a conversation. Acknowledge for CLD is the AC3 telegram.



9.2.3.2.4. Acknowledge decoder (ADE)

ADE is a decoder which becomes active upon transmitting a telegram requesting an ackowledgement. Specified under ,ACE. If an acknowledgement is not received within the limit assigned to ,RTI the requesting telegram will be retransmitted. This cycle will repeat itself until either an acknowledgement is received or the number of cycles becomes equal to the value assigned to ,REP.
When ADE is specified, the loudspeaker will first open upon reception of the telegram specified under ADE.

9.2.3.3. Auxiliary telegrams

Auxiliary telegrams are telegrams which can be appended to a functional telegram. Note that auxiliary telegrams cannot ' leave the house unless accompanied by a parent", i.e. a functional telegram.
Two telegrams, denoted by the identifiers STF and TTF are available.

Example: Consider the telegram sequence below.

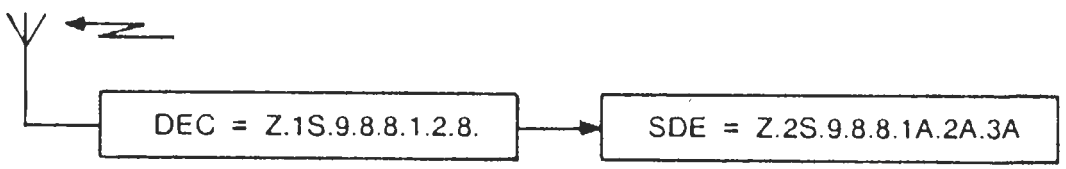
E N C S T F

This sequence is assigned when writing:

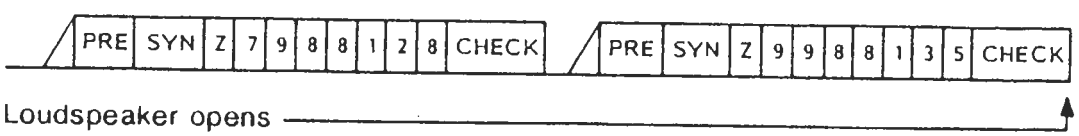
```
ENC       = Z.7.9.8.8.1.2.8
    ,FOL  = STF
            :
            :
STF       = Z.9.9.8.8.1.3.5
```

9.2.3.4. Auxiliary decoder telegrams

The auxiliary decoder telegram is denoted by the identifier SDE. It must always be appended to a decoder telegram.
Normally it is used for queue handling as shown in the following example:



Receiving:



The display will then show:

*	3		A	1	3	5						S	R	7	9

Ordered as:

DEC = Z.1S 9.8.8.1.2.8
,FOL = SDE
:
:
SDE = Z.2S.9.8.8.1A.2A.3A

9.2.4. GROUP CALLS

When designing a group call scheme for the system, you start by assigning the group digit "F" to GRP.

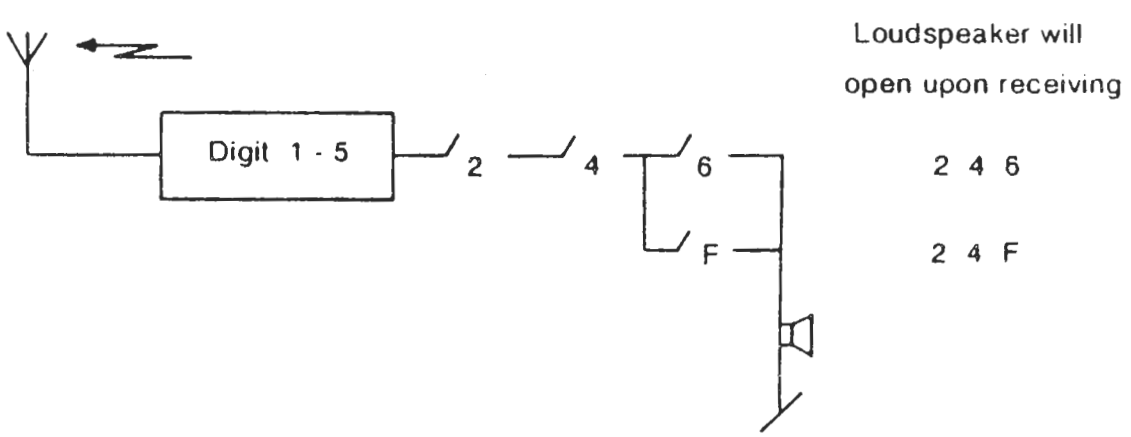
GRP = F

The group digit is used both for decoding and encoding group calls.
Next, you decide which position in the decoder telegram the group tone is to be assigned to. There are precisely three possible ways in which a group call set-up can be made. See the examples given on the next page.

Example 1, Ten Group
If we write

GRP = F
,POS = 8
:
:
DEC = Z.X.9.8.8.2.4.6

we get the set-up in ill. 6 below.



ill. 6: Ten Group.

Example 2, Hundred Group

If we write GRP = F

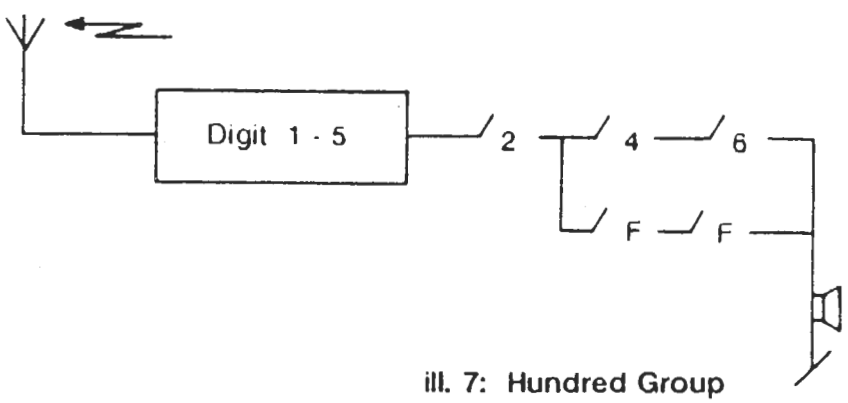
,POS = 7

:

:

DEC = Z.X.9.8.8.2.4.6

we get the set-up in ill. 7:



Loudspeaker will open upon receiving

2 4 6

2 F F

ill. 7: Hundred Group

Example 3, All Call

If we write GRP = F

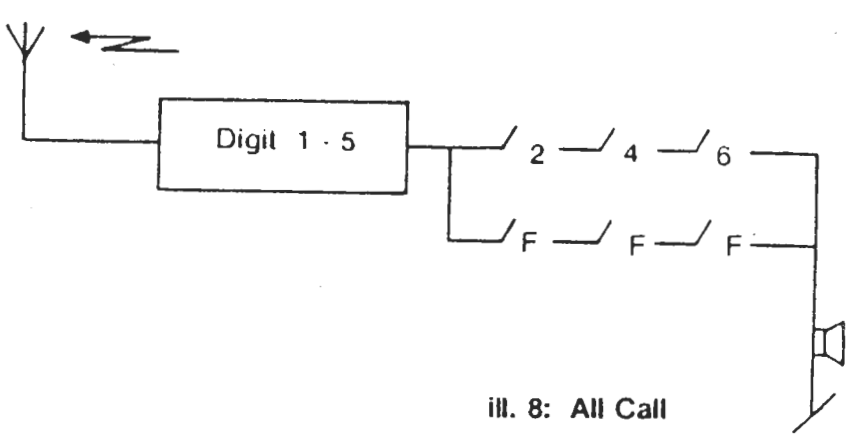
,POS = 6

:

:

DEC = Z.X.9.8.8.2.4.6

we get the set-up in ill. 8:



Loudspeaker will open upon receiving

2 4 6

F F F

ill. 8: All Call

9.2.5. ZVEI BINARY CODE TABLE

DIGIT	TRANSMITTED AS	REMARKS
0	0000	Normal digit
1	0001	Normal digit
2	0010	Normal digit
3	0011	Normal digit
4	0100	Normal digit
5	0101	Normal digit
6	0110	Normal digit
7	0111	Normal digit
8	1000	Normal digit
9	1001	Normal digit
A	1010	Special digit
B	1011	Special digit
C	1100	Special digit
D	1101	Special digit
E	1110	Special digit
F	1111	Group digit
X	0000	Don't care

Digit length:	4 bits
Preamble:	9 bits

Logical 1:	1200 Hz
Logical 0:	1800 Hz

9.3. ZVEI BINARY TELEGRAM INPUTS

9.3.1. GENERAL INPUTS (SPS = 0)

9.3.1.1. Tone system

TON	= BZV	
,PRE	= {S/2}	Default = S
,DUR	= S	Always S for binary signalling
,BAS	= {Y/N}	Base station (Y)es or (N)o.

9.3.1.2. Group digit

GRP	= F	Default = F (always F)
,POS	= {6 . . 8}	Group tone position 6/7/8 or any combination.
,BDT	= {N/0 - 254}	Group break down timer in seconds.
		N = Timer disabled.

```
CQM6000: Software EF-R5.0    EF Field Programmer.  << Input:  SPS=0 >>
-------------------------------------------------------------------------
                                        Carr.Contr.Timer:  CCT= N

Address Digits      ADI= 3
Status Digits       SDI= 2              Tone System         TON= BZV
                                         Preamble Time:    ,PRE= S
Privacy:            PRI= N               Duration:         ,DUR= S
                   ,BDT= 30              Base Set-Up:      ,BAS= N
                   ,MAT= Y               DTM-Mode Enable:  ,DTM= N
                   ,MAC= N

Push To Talk Adm.: PTA= 0               Group Digit:        GRP= F
 Codeplug needed: ,PLG= N                Pos.of Groupdig:  ,POS= 8
                                         Break down Time:  ,BDT= 3
Tone key admit:     TKA= 0
 Codeplug needed: ,PLG= N

2nd Tonekey Adm.:  SKA= 0
 Codeplug needed: ,PLG= N


-------------------------------------------------------------------------
Syntax:          0 ..       254,  N*  Default: 3
```

9.3.2. ENCODER TELEGRAM DATA INPUTS

9.3.2.1. Encoder telegram

ENC = {telegram digits/N} Default = N

The ENC telegram must always consist of 8 digits, the first being entered as ENC = Z . . . . . and ended by inputting N.
The encoder may be followed by STF = and TTF = .

```
CQM6000: Software EF-R5.0    EF Field Programmer.  << Input:   SPS=0 >>
-------------------------------------------------------------------------
Signal-Digits      (TX - Telegrams)              TON PRE  DUR   FOL PRE  DUR
ENC=Z  2S 9  8  8  C1 C2 1A N                    S   S    S     STF S    S
```

```
-------------------------------------------------------------------------
Syntax:          10 ..      2540,  S^N^  Default: S
```

9.3.2.2. Second encoder

SNC = {telegram digits/N} Default = N

9.3.2.3. Third encoder

TNC = {telegram digits/N} Default = N

See ENC = .

9.3.2.4. Transmit on first PTT

TOF = {telegram digits/N} Default = N

9.3.2.5. Transmit on every PTT

TOE = {telegram digits/N} Default = N

Specified as described for binary ENC= .

9.3.2.6. Identification timer

,IDT = {1 - 254/N} Default = N

IDT= (time in seconds) defines the telegram specified by TOE= to be transmitted at regular intervals for identification as long as the PTT button is depressed. If not used then IDT = N.

```
CQM6000: Software EF-R5.0    EF Field Programmer.  << Input:   SPS=0 >>
-------------------------------------------------------------------------------
Signal-Digits      (TX - Telegrams)              TON PRE  DUR   FOL PRE  DUR

ENC=Z  2S 9  8  8  C1 C2 1A N                    S   S    S     TTF S    S
SNC=Z  1S 9  8  8  C1 C2 1A N                    S   S    S     TTF S    S
TNC=N
TOF=N
TOE=Z  1S 9  8  8  0  0  0  N                    S   S    S     STF S    S
,IDT=30
```

```
-------------------------------------------------------------------------------
Syntax:          1 ..       254,  N  Default: N
```

9.3.2.7. Acknowledge telegrams

AC1 = {telegram digits/N} Default = N

AC2 = {telegram digits/N} Default = N

AC3 = {telegram digits/N} Default = N

The acknowledge telegrams are specified as described for ENC= and released as follows:

- AC1 = {telegram} for decoder DEC=
- AC2 = {telegram} for parallel decoder PDE=
- AC3 = {telegram} for clear down decoder CLD=

```
CQM6000: Software EF-R5.0    EF Field Programmer.  << Input:   SPS=0 >>
-------------------------------------------------------------------------------
Signal-Digits       (TX - Telegrams)                TON PRE  DUR   FOL PRE  DUR

ENC=Z  2S 9  8  8  C1 C2 1A N                       S   S    S     TTF S    S
SNC=Z  1S 9  8  8  C1 C2 1A N                       S   S    S     TTF S    S
TNC=N
TOF=N
TOE=Z  1S 9  8  8  0  0  0  N                       S   S    S     STF S    S
,IDT=30
AC1=Z  1S 9  8  8  C1 C2 N                          S   S    S     TTF S    S
AC2=Z  9  8  6  7  C1 C2 N                          S - S    S     TTF S    S
AC3=Z  9  8  8  X  X  X  N                          S   S    S     TTF S    S
ACT= 0.30
```

```
-------------------------------------------------------------------------------
Syntax:          0 ..          3,    Default: 0.15
```

9.3.2.7.1. Acknowledge timer

,ACT = {0 - 2.5} Default = 0.15

The acknowledge timer defines the delay in seconds (0.01 sec. steps) from a call has been detected till the corresponding acknowledge telegram is transmitted.

9.3.2.8. Hang-up telegram

HUT = {telegram digits/N} Default = N

The telegram is specified as described for ENC= and released when the operator terminates a conversation either by closing the loudspeaker or, if used, places the handset in the retainer.

```
CQM6000: Software EF-R5.0    EF Field Programmer.  << Input:   SPS=0 >>
-------------------------------------------------------------------------
Signal-Digits      (TX - Telegrams)              TON PRE  DUR   FOL PRE  DUR

ENC=Z  2S 9  8  8  C1 C2 1A N                    S   S    S     TTF S    S
SNC=Z  1S 9  8  8  C1 C2 1A N                    S   S    S     TTF S    S
TNC=N
TOF=N
TOE=Z  1S 9  8  8  0  0  0  N                    S   S    S     STF S    S
,IDT=30
AC1=Z  1S 9  8  8  C1 C2 0  N                    S   S    S     TTF S    S
AC2=Z  9  8  6  7  C1 C2 5  N                    S   S    S     TTF S    S
AC3=Z  9  8  8  X  X  X  6  N                    S   S    S     TTF S    S
ACT= 0.30
HUT=Z  1S 9  8  8  1A 2A 3A N                    S   S    S     N

-------------------------------------------------------------------------
Syntax: N^STF^TTF^  Default: N
```

9.3.2.8.1. Second telegram format

STF = {telegram digits/N} Default = N

9.3.2.8.2. Third telegram format

TTF = {telegram digits/N} Default = N

The STF= and TTF= are auxiliary telegrams which can be appended to any of the functional telegrams by assigning FOL = {STF/TTF}.

```
CQM6000: Software EF-R5.0    EF Field Programmer.  << Input:   SPS=0 >>
-------------------------------------------------------------------------------
Signal-Digits      (TX - Telegrams)                 TON PRE  DUR   FOL PRE  DUR .

ENC=Z  2S 9  8  8  C1 C2 1A N                       S   S    S     TTF S    S
SNC=Z  1S 9  8  8  C1 C2 1A N                       S   S    S     TTF S    S
TNC=N
TOF=N
TOE=Z  1S 9  8  8  0  0  0  N                       S   S    S     STF S    S
,IDT=30
AC1=Z  1S 9  8  8  C1 C2 0  N                       S   S    S     TTF S    S
AC2=Z  9  8  6  7  C1 C2 5  N                       S   S    S     TTF S    S
AC3=Z  9  8  8  X  X  X  6  N                       S   S    S     TTF S    S
ACT= 0.30
HUT=Z  1S 9  8  8  1A 2A 3A N                       S   S    S     N

STF=1A 2A 3A N                                      S   S    S
TTF=1S 2S N                                         S   S

-------------------------------------------------------------------------------
Syntax:          10 ..       2540,  S^N^  Default: S
```

9.3.3. DECODER TELEGRAM DATA INPUTS

9.3.3.1. Decoder

DEC = {telegram digits/N} Default = N

9.3.3.2. Parallel decoder

PDE = {telegram digits/N} Default = N

,SIL = {Y/N} Default = N

9.3.3.3. Clear down decoder

CLD = {telegram digits/N} Default = N

9.3.3.4. Acknowledge decoder

ADE	= {telegram digits/N}	Default = N
,ACE	= {1/2/3/4/5/6/N}	Default = N
,REP	= {0 - 15}	Default = 0
,RTI	= {0 - 25.4}	Default = 1

```
CQM6000: Software EF-R5.0    EF Field Programmer.  << Input:  SPS=0 >>
-------------------------------------------------------------------------
Signal-Digits    (RX - Telegrams)                                   FOL

DEC=Z  9  8  5  6  2  1  3  N                                      SDE
PDE=Z  9  8  5  6  2  C1 C2 N                                      SDE
,SIL=Y
CLD=Z  9  8  6  5  5  0  0  N                                      N
ADE=Z  9  8  6  6  5  0  0  N                                      N
,ACE=126
,REP=5
,RTI=1.0

SDE=ZA 2S 9A 8A 8A 1A 2A 3A N


-------------------------------------------------------------------------
ok?    (Yes/No/Menu)
```

The functional decoders are all specified by entering 8 telegram digits of which the first must be "Z" and ended by entering "N".
The decoders may be followed by a serial decoder SDE by writing FOL = SDE and defining SDE = {telegram digits}.

9.3.3.4.1. Silent interrogate

,SIL = {Y/N} Default = N

The silent interrogate is a special function which makes it possible for the base station to request a status telegram (AC2) be transmitted by the mobile without opening the loudspeaker and sounding the normal alert signal.
If SIL = Y is specified the AC2 = {telegram} must also be defined. Otherwise an error occurs during prom data calculations.

9.3.3.4.2. Acknowledge expected selector

,ACE = {1/2/3/4/5/6/N} Default = N

The ,ACE subfunction defines on which telegram(s) the acknowledge decoder should be active and expect an acknowledge telegram to be returned by the called station.
The program accepts that one or several encoder telegrams are specified.

ACE = 1	Acknowledge expected on ENC = telegram
ACE = 2	Acknowledge expected on SNC = telegram
ACE = 3	Acknowledge expected on TNC = telegram
ACE = 4	Acknowledge expected on TOF = telegram
ACE = 5	Acknowledge expected on TOE = telegram
ACE = 6	Acknowledge expected on HUT = telegram
ACE = N	Acknowledge not expected (ADE = N)

Example:
Acknowledge telegram expected upon transmission of ENC, SNC and HUT:

Input: ,ACE = 126

Note: All telegrams to which the ACE is referring must be defined using the appropriate function.

9.3.3.4.3. Repetitions

,REP = {0 - 15} Default = 0

The REP= subfunction defines the number of retry transmission of the telegram(s) which has been defined under ACE= . The radio always transmits the telegram once and then, if no acknowledge is received, retries at intervals defined by RTI= until acknowledge is either received or the number as defined by REP is reached.

9.3.3.4.4. Repetition time

,RTI = {0-25.4} Default = 1

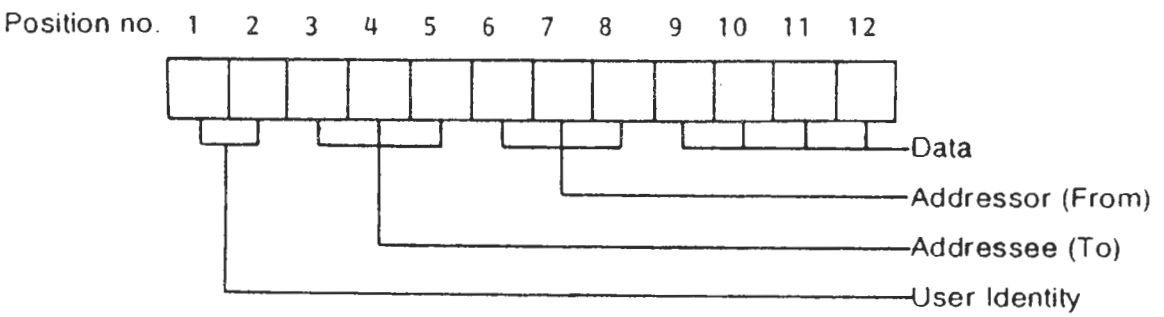
The RTI= subfunction defines the interval between retry transmissions as defined by REP.

The time is specified in seconds, legal range being 0 - 25.4 seconds in 0.1 sec. steps. The minimum time that can be specified must be at least PRE + DUR + length of the expected telegram to be received.

9.4. THE BINARY EEA TELEGRAM MESSAGE BLOCK

9.4.1. FUNCTIONAL ENCODER AND DECODER TELEGRAMS

For telegrams belonging to these categories, the 12 positions have the following interpretation, see ill. 9 below.



ill. 9: The Message Block

9.4.1.1. Position 1 and 2 : User identity

Position 1 contains one of the values

8/9/A/B/C/D/E/F

while position 2 contains one of the values

0/1/2/3/4/5/6/7/8/9/A/B/C/D/E/F

Example:

ENC = 9.1. . . . . .

9.4.1.2. Position 3, 4, and 5: Address (to)

These positions are used to indicate the identity of the receiving party. Each position can be occupied by:

either a fixed digit, that is,
0/1/2/3/4/5/6/7/8/9/A/B/C/D/E/X
where "X" is the Don't care digit.

or a reference to the a digit in the address field in the display (ill. 10):
1A/2A/3A/4A/5A/6A/7A,

C				A	2	4	6	8	0	2	4		S		
Reference				1A	2A	3A	4A	5A	6A	7A					

ill. 10: Reference digits in address field

or a reference to a digit in the codeplug:
C01 C02 C03 C04 C05 C06 C07 C08 C09 C10 C11 C12 C13 C14 C15 C16
C17 C18 C19 C20 C21 C22 C23 C24 C25 C26 C27 C28

Examples:

ENC = 9.1.2.4.6. . . . . .

DEC = 9.1.2.4.X. . . . . .

ENC = 9.1.1A.2A.3A. . . . . .

DEC = 9.1.C01.C02.C03. . . . . .

9.4.1.3. Position 6, 7, and 8: Addressor (from)

These posisitons are used to indicate the identity of the radio as seen from the system point of view (not necessarily the user's point of view). Each position contains:

either a fixed digit, that is
0/1/2/3/4/5/6/7/8/9/A/B/C/D/E/X
where "X" is the Don't-care-digit.

or a reference to a digit in the codeplug:
C01 C02 C03 C04 C05 C06 C07 C08 C09 C10 C11 C12 C13 C14 C15 C16
C17 C18 C19 C20 C21 C22 C23 C24 C25 C26 C27 C28

Examples:

ENC = 9.1.2.4.6.1.2.3. . . .

DEC = 9.1.C01.C02.C03.1A.2A.3A. . . .

ENC = 9.1.1A.2A.3A.C01.C02.C03. . . .

9.4.1.4. Position 9, 10, 11, 12: Data

These positions are used to convey more information. Each position can be occupied by:

either a fixed digit, that is
0/1/2/3/4/5/6/7/8/9/A/B/C/D/E/F/X
where "X" is the Don't-care-digit

or a reference to a digit in the address field or status field in the display, that is,
1A/2A/3A/4A/5A/6A/7A/1S/2S. See ill. 11

Encoding:

C	1	9		A	2	4	6	8	0	1	3		S	7	9
Reference:					1A	2A	3A	4A	5A	6A	7A			1S	2S

Decoding:

*	3		A	1	3	5						S	R	7	9
Reference:				1A	2A	3A								1S	2S

ill. 11: Display reference digits

or a reference to a digit in the codeplug:
C01 C02 C03 C04 C05 C06 C07 C08 C09 C10 C11 C12 C13 C14 C15 C16
C17 C18 C19 C20 C21 C22 C23 C24 C25 C26 C27 C28

Examples:

ENC = 9.1.2.4.6.1.2.3.X.2.3.4

ENC = 9.1.1A.2A.3A.2.4.6.4A.5A.C01.X

DEC = 9.1.2.4.6.1A.2A.3A.4A.5A.1S.2S.

9.4.2. AUXILIARY TELEGRAMS AND AUXILIARY DECODERS

For telegrams and decoders belonging to these categories, the 12 positions have no interpretation; they are all used for additional data.

9.4.2.1. Position 1

The range of digit values which can be put into position 1 is restricted to:

0/1/2/3/4/5/6/7

9.4.2.2. Positions 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

Each position can be occupied by

either a fixed digit, that is
0/1/2/3/4/5/6/7/8/9/A/B/C/D/E/F/X
where "X" is the Don't-care-digit

or a reference to a digit in the address field
or status field in the display, that is,
1A/2A/3A/4A/5A/6A/7A/1S/2S .

or a reference to a digit in the codeplug:
C01 C02 C03 C04 C05 C06 C07 C08 C09 C10 C11 C12 C13 C14 C15 C16
C17 C18 C19 C20 C21 C22 C23 C24 C25 C26 C27 C28

Examples:

STF = 0.1.3.5.1A.2A.3A.1S.2S.X.C07.C08

SDE = 0.X.X.X.4A.5A.6A.7A.1S.2S.X.X

9.4.3. REFERENCE DIGITS

9.4.3.1. Codeplug reference digits

A codeplug reference digit is a pointer to a digit located in the codeplug. The codeplug may contain up to 28 digits denoted C01 to C28 in the nomenclature.

Example:

Radio	DEC = 8.1.C01.C02.C03.X.X.X.X.X.X.X
Codeplug	C01 = 1
	C02 = 2
	C03 = 3

When the codeplug is inserted in the radio, the decoder code will be:

8.1.1.2.3.X.X.X.X.X.X.X

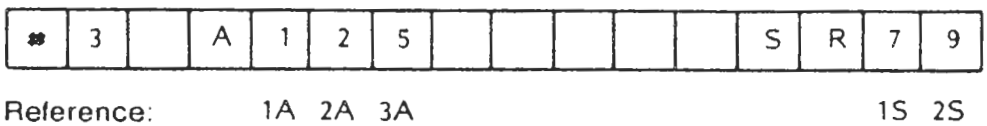
9.4.3.2. Display reference digits

The references indicate the position in the display. The display has two different configurations:

For encoding:

C	1	9		A	2	4	6	8	0	1	3		S	7	9
Reference:					1A	2A	3A	4A	5A	6A	7A			1S	2S

For decoding:



ill. 12: Display reference digits

9.4.3.2.1. Encoders and display reference digits

An encoder will always read a display reference digit as:

"Take the value in the display" - and then transmit it.

Example:
You have written: ENC = 9.1.1A.2A.3A.1.2.3.1S.2S.4A.5A in the software specification and the display is as shown above (encoding).
The radio will then transmit the telegram corresponding to the string 9.1.2.4.6.1.2.3.7.9.8.0 when the [♪] button is pushed.

9.4.3.2.2. Decoders and display reference digits

Display reference digits must only be used if SPS = 0.
A decoder will always read a reference digit as:

"Write the value in the display."

Example:

You have written :

DEC = 9.1.1.2.3.1A.2A.3A.1S.2S.X.X

in the software specification and the telegram received is:

PRE	SYN	9	1	1	2	3	1	3	5	7	9	X	X	CHECK	SYN

The queue display will then be as shown on the previous page (decoding).

9.4.3.3. Don't-care-digits

If a certain position in a telegram is not going to be used, you can write X in this position when defining the telegram. The decoders will then "close the switch" and encoders will transmit four logical zeros. See the table at the end of this appendix.

9.4.4. TELEGRAM TYPES

The CQM6000 EF Software contains four System Personality Set-up's (SPS), each with up to 16 telegrams which fall into four categories:

- Functional telegrams (9)
- Decoder telegrams (4)
- Auxiliary telegrams (2)
- Auxiliary decoder telegrams (1)

Please note that the total number of telegrams in all SPS's must not exceed 18!

9.4.4.1. Functional telegrams

The CQM6000 EF Software includes nine functional telegrams. Such a telegram is transmitted after one of the following actions or events:

Action/event:	Telegram:
Pushing the [♪] button	ENC
Pushing the [A] button	SNC
Pushing the external emergency button	TNC
Pushing the PTT button with loudspeaker off	TOF
Pushing the PTT button	TOE
Decoding DEC	AC1
Decoding PDE	AC2
Decoding CLD	AC3
Placing the handset in the cradle or closing the loudspeaker manually	HUT

9.4.4.1.1. Third encoder (TNC) - Emergency procedure

The third encoder telegram is released from the 25 pin connector on the rear side of the radio. When it is released, the emergency procedure is carried out according to the ZVEI recommendation.

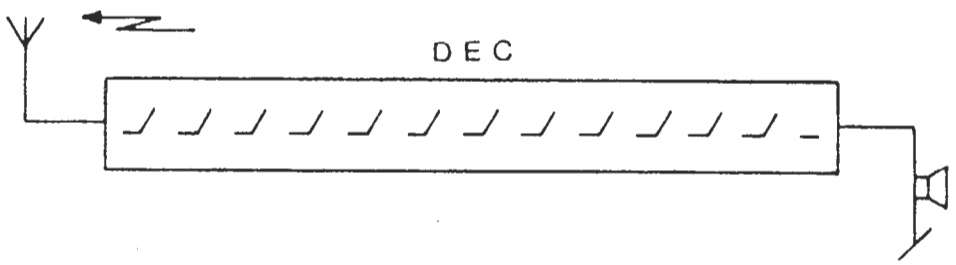
9.4.4.2. Decoder telegrams

A decoder telegram is a telegram which can be decoded ("understood") by the radio. The CQM 6000 EF Software comprises four decoder telegrams:

DEC - PDE - CLD - ADE

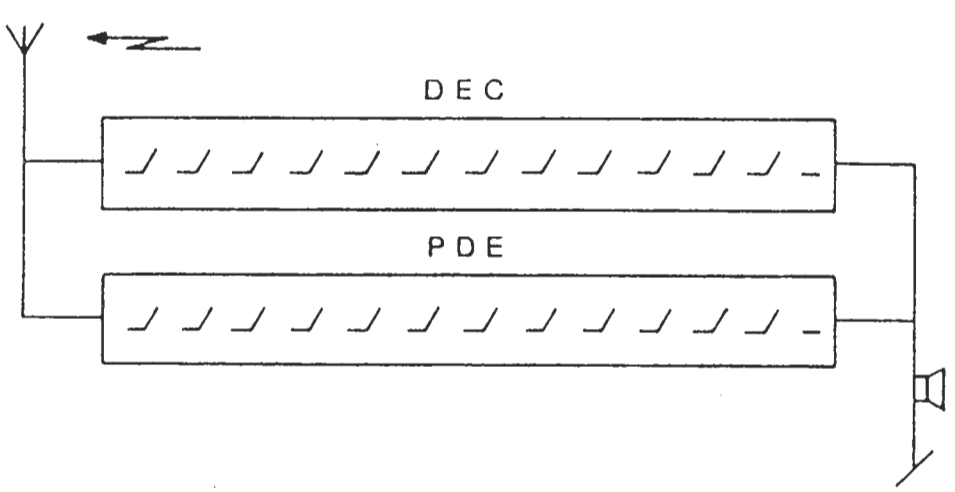
9.4.4.2.1. Decoder (DEC)

The DEC is the mobile radio's identity in the system; i.e the "telephone number" of the radio as seen from the system's point of view. (But not necessarily from the users' points of view). The acknowledge for DEC is the AC1 telegram.



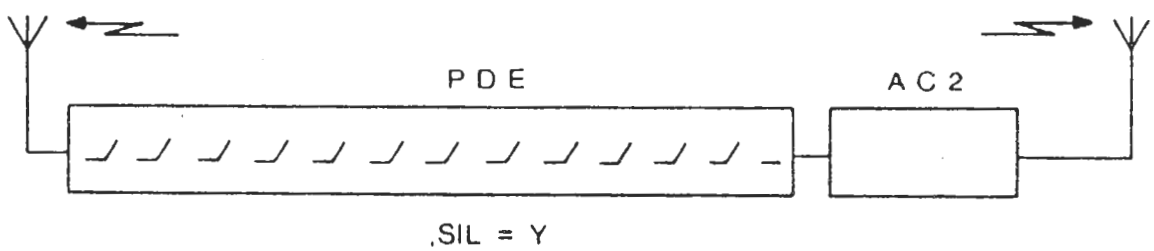
9.4.4.2.2. Parallel decoder (PDE)

The PDE is an alternative decoder (placed in parallel to
the normal decoder, DEC) which makes it possible for the radio to have an additional identity, e.g. in the codeplug.
The acknowledge for PDE is the AC2 telegram.



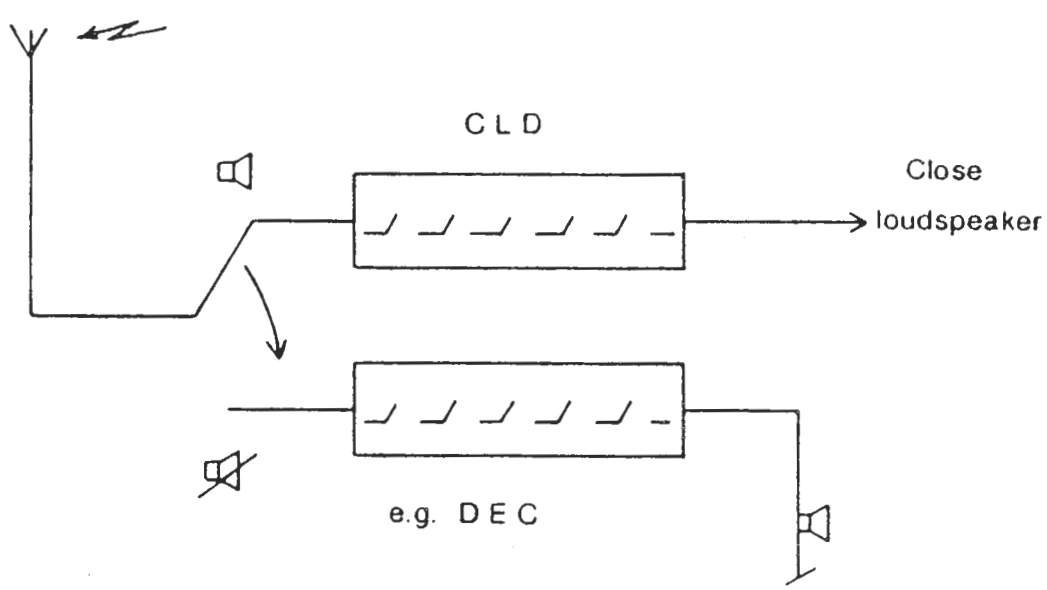
Silent interrogate (,SIL)

The ,SIL is a special function which makes it possible for the base station to request a status telegram (AC2) from the mobile station without opening the loudspeaker and initiating the normal alert signal.



9.4.4.2.3. Clear-down decoder (CLD)

The CLD is a special decoder which is used in systems where you want active clear-down of a conversation. Acknowledge for CLD is the AC3 telegram.



9.4.4.2.4. Acknowledge decoder (ADE)

ADE is a decoder which becomes alive upon transmitting a telegram requesting an ackowledgement specified under ,ACE. If an acknowledgement is not received within the limit assigned to ,RTI the requesting telegram will be retransmitted. This cycle will repeat itself until either an acknowledgement is received or the number of cycles becomes equal to the value assigned to ,REP.

When ADE is specified, the loudspeaker will first open upon reception of the telegram specified under ADE.

9.4.4.3. Auxiliary telegrams

Auxiliary telegrams are telegrams which can be appended to a functional telegram. Note that auxiliary telegrams cannot "leave the house unless accompanied by a parent", i.e. a functional telegram.
Two telegrams, denoted by the identifiers STF and TTF are available.

Example: Consider the telegram sequence below.

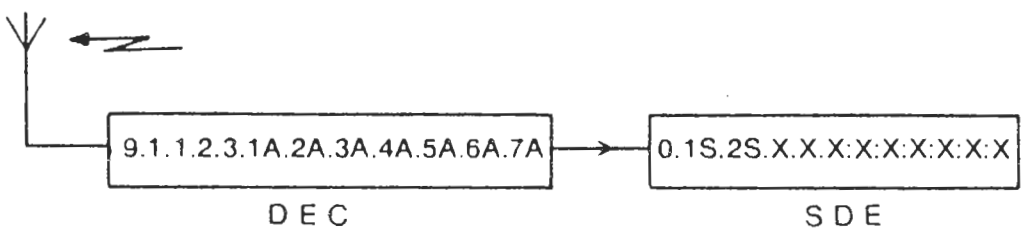
E N C S T F

This sequence is assigned when writing:

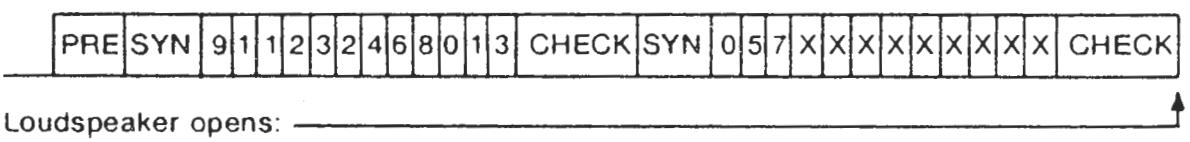
ENC = 9.1.2.4.6.1.2.3.7.9.8.0
,FOL = STF
:
:
STF = 0.1.2.3.4.5.6.7.8.9.0.1

9.4.4.4. Auxiliary decoder telegrams

The auxiliary decoder telegram is denoted by the identifier SDE. It must always be appended to a decoder telegram.
Normally it is used for queue handling as shown in the following example:



Receiving:



The display will then show:

*	3		A	2	4	6	8	0	1	3		S	R	5	7

Ordered as:

DEC = 9.1.1.2.3.1A.2A.3A.4A.5A.6A.7A
,FOL = SDE
:
:
SDE = 0.1S.2S.X.X.X.X.X.X.X.X

9.4.5. GROUP CALLS

When designing a group call scheme for the system, you start by assigning the group digit "F" to GRP.

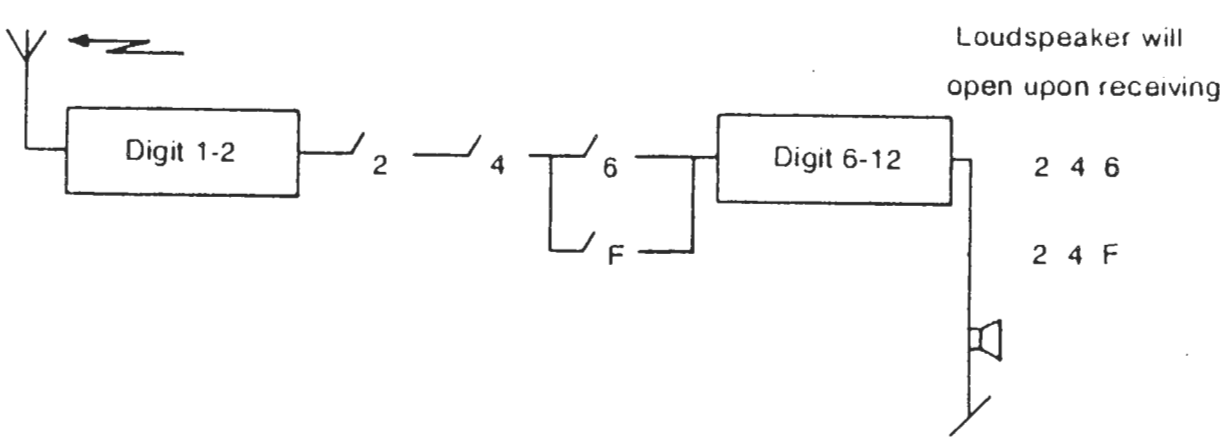
GRP = F

The group digit is used both for decoding and encoding group calls.
Next, you decide which position in the decoder telegram the group tone is to be assigned to. There are precisely three possible ways in which a group call set-up can be made. See the examples given below.

Example 1, Ten Group
If we write

GRP = F
,POS = 5
:
:
DEC = 9.1.2.4.6.1A.2A.3A.1S.2S.X.X

we get the set-up in ill. 13 below.



ill. 13: Ten Group.

Example 2, Hundred Group

If we write

GRP = F

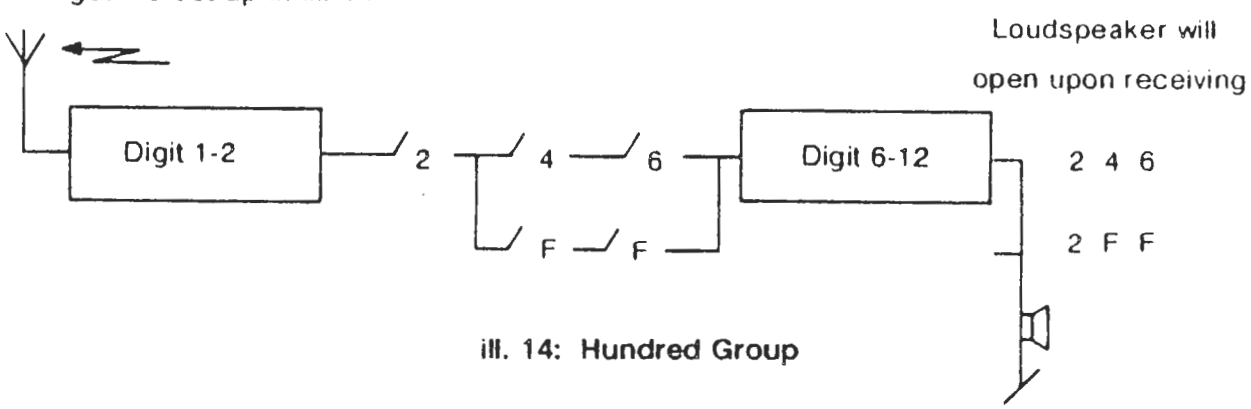
,POS = 4

:

:

DEC = 9.1.2.4.6.1A.2A.3A.1S.2S.X.X

we get the set-up in ill. 14



ill. 14: Hundred Group

Example 3, All Call

If we write

GRP = F

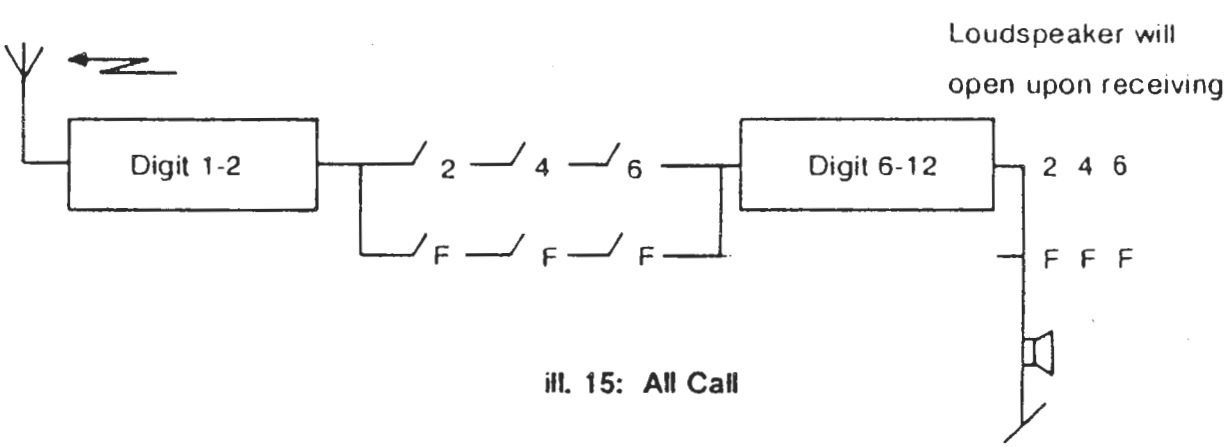
,POS = 3

:

:

DEC = 9.1.2.4.6.1A.2A.3A.1S.2S.X.X

we get the set-up in ill. 15



ill. 15: All Call

9.4.6. EEA BINARY CODE TABLE

DIGIT	TRANSMITTED AS	REMARKS
0	0000	Normal digit
1	0001	Normal digit
2	0010	Normal digit
3	0011	Normal digit
4	0100	Normal digit
5	0101	Normal digit
6	0110	Normal digit
7	0111	Normal digit
8	1000	Normal digit
9	1001	Normal digit
A	1010	Special digit
B	1011	Special digit
C	1100	Special digit
D	1101	Special digit
E	1110	Special digit
F	1111	Group digit
X	0000	Don't care

Digit length:	4 bits
Preamble:	16 bits

Logical 1:	1200 Hz
Logical 0:	1800 Hz

9.5. EEA BINARY TELEGRAM INPUTS

9.5.1. GENERAL INPUTS (SPS = 0)

9.5.1.1. Tone system

TON	= BEE	
,PRE	= {S/2}	Default = S
,DUR	= S	Always S for binary signalling
,BAS	= {Y/N}	Base station (Y)es or (N)o.

9.5.1.2. Group digit

GRP	= F	Default = F (always F)
,POS	= {6 . . 8}	Group tone position 3/4/5/6/7/8 or any combin.
,BDT	= {N/0 - 254}	Group break down timer in seconds.
		N = Timer disabled.

```
CQM6000: Software EF-R5.0    EF Field Programmer.  << Input:  SPS=0 >>
-------------------------------------------------------------------------------

                                        Carr.Contr.Timer:  CCT= N
Address Digits      ADI= 5
Status Digits       SDI= 2              Tone System         TON= BEE
                                         Preamble Time:    ,PRE= S
Privacy:            PRI= N               Duration:        ,DUR= S
                   ,BDT= 30              Base Set-Up:     ,BAS= Y
                   ,MAT= Y               DTM-Mode Enable: ,DTM= N
                   ,MAC= N

Push To Talk Adm.: PTA= 0               Group Digit:        GRP= F
 Codeplug needed: ,PLG= N                Pos.of Groupdig:  ,POS= 678
                                         Break down Time:  ,BDT= 3
Tone key admit:     TKA= 0
 Codeplug needed: ,PLG= N

2nd Tonekey Adm.:  SKA= 0
 Codeplug needed: ,PLG= N


-------------------------------------------------------------------------------
ok?   (Yes/No/Menu)
```

9.5.2. ENCODER TELEGRAM DATA INPUTS

9.5.2.1. Encoder telegram

ENC = {telegram digits/N} Default = N

The ENC telegram must always consist of 12 digits and ended by inputting N.
The encoder may be followed by STF= and TTF= .

```
CQM6000: Software EF-R5.0    EF Field Programmer.  << Input:   SPS=0 >>
-------------------------------------------------------------------------
Signal-Digits      (TX - Telegrams)              TON PRE  DUR   FOL PRE  DUR
ENC=9  1S 1A 2A 3A 2  2  4A 5A C1 1  0  N        S   S    S     TTF S    S
```

```
-------------------------------------------------------------------------
Syntax:          10 ..       2540,  S^N^  Default: S
```

9.5.2.2. Second encoder

SNC = {telegram digits/N} Default = N

9.5.2.3. Third encoder

TNC = {telegram digits/N} Default = N

See ENC= .

9.5.2.4. Transmit on first PTT

TOF = {telegram digits/N} Default = N

9.5.2.5. Transmit on every PTT

TOE = {telegram digits/N} Default = N

Specified as described for binary ENC= .

9.5.2.5.1. Identification timer

,IDT = {1 - 254/N} Default = N

IDT= (time in seconds) defines the telegram specified by TOE= to be transmitted at regular intervals for identification as long as the PTT button is depressed. If not used then IDT = N.

```
CQM6000: Software EF-R5.0    EF Field Programmer.  << Input:   SPS=0 >>
-------------------------------------------------------------------------------
Signal-Digits       (TX - Telegrams)                TON PRE  DUR   FOL PRE  DUR

ENC=9  1S 1A 2A 3A 2  2  4A 5A C1 1  0  N          S   S    S     TTF S    S
SNC=9  1  1A 2A 3A 1  4  1  4A 5A C1 1  N          S   S    S     TTF S    S
TNC=N
TOF=N
TOE=9  1  1A 2A 3A 2  4  6  4A 5A X  X  N          S   S    S     STF S    S
,IDT=30
```

```
-------------------------------------------------------------------------------
Syntax:            1 ..        254,  N  Default: N
```

9.5.2.6. Acknowledge telegrams

AC1 = {telegram digits/N} Default = N

AC2 = {telegram digits/N} Default = N

AC3 = {telegram digits/N} Default = N

The acknowledge telegrams are specified as described for ENC = and released as follows:

- AC1 = {telegram} for decoder DEC =
- AC2 = {telegram} for parallel decoder PDE =
- AC3 = {telegram} for clear down decoder CLD =

```
CQM6000: Software EF-R5.0    EF Field Programmer.  << Input:   SPS=0 >>
-------------------------------------------------------------------------
Signal-Digits      (TX - Telegrams)              TON PRE  DUR   FOL PRE  DUR

ENC=9  1S 1A 2A 3A 2  2  4A 5A C1 1  0  N       S   S    S     TTF S    S
SNC=9  1  1A 2A 3A 1  4  1  4A 5A C1 1  N       S   S    S     TTF S    S
TNC=N
TOF=N
TOE=9  1  1A 2A 3A 2  4  6  4A 5A X  X  N       S   S    S     STF S    S
,IDT=30
AC1=9  1  1A 2A 3A 11 C2 0  4A 5A 1S 2S N       S   S    S     TTF S    S
AC2=9  1  1A 2A 3A C1 C2 5  4A 5A 1S 2S N       S   S    S     TTF S    S
AC3=9  9  8  8  X  X  X  6  X  X  X  X  N       S   S    S     TTF S    S
ACT= 1.50
```

Syntax: 0 .. 3, **Default:** 0.15

9.5.2.6.1. Acknowledge timer

,ACT = {0 - 2.5} Default = 0.15

The acknowledge timer defines the delay in seconds (0.01 sec. steps) from a call has been detected till the corresponding acknowledge telegram is transmitted.

9.5.2.7. Hang-up telegram

HUT = {telegram digits/N} Default = N

The telegram is specified as described for ENC= and released when the operator terminates a conversation either by closing the loudspeaker or, if used, places the handset in the retainer.

```
CQM6000: Software EF-R5.0    EF Field Programmer.  << Input:   SPS=0 >>
-------------------------------------------------------------------------------
Signal-Digits       (TX - Telegrams)              TON PRE  DUR   FOL PRE  DUR

ENC=9  1S 1A 2A 3A 2  2  4A 5A C1 1  0  N        S   S    S     TTF S    S
SNC=9  1  1A 2A 3A 1  4  1  4A 5A C1 1  N        S   S    S     TTF S    S
TNC=N
TOF=N
TOE=9  1  1A 2A 3A 2  4  6  4A 5A X  X  N        S   S    S     STF S    S
,IDT=30
AC1=9  1  1A 2A 3A 11 C2 0  4A 5A 1S 2S N        S   S    S     TTF S    S
AC2=9  1  1A 2A 3A C1 C2 5  4A 5A 1S 2S N        S   S    S     TTF S    S
AC3=9  9  8  8  X  X  X  6  X  X  X  X  N        S   S    S     TTF S    S
ACT= 1.50
HUT=9  1  X  X  X  X  X  X  X  X  X  X  N        S   S    S     N

-------------------------------------------------------------------------------
Syntax: N^STF^TTF^  Default: N
```

9.5.2.8. Second telegram format

STF = {telegram digits/N} Default = N

9.5.2.9. Third telegram format

TTF = {telegram digits/N} Default = N

The STF= and TTF= are auxiliary telegrams which can be appended to any of the functional telegrams by assigning FOL = {STF/TTF}.

```
CQM6000: Software EF-R5.0    EF Field Programmer.  << Input:   SPS=0 >>
-------------------------------------------------------------------------------
Signal-Digits      (TX - Telegrams)                TON PRE  DUR   FOL PRE  DUR

ENC=9  1S 1A 2A 3A 2  2  4A 5A C1 1  0  N        S   S    S     TTF S    S
SNC=9  1  1A 2A 3A 1  4  1  4A 5A C1 1  N        S   S    S     TTF S    S
TNC=N
TOF=N
TOE=9  1  1A 2A 3A 2  4  6  4A 5A X  X  N        S   S    S     STF S    S
,IDT=30
AC1=9  1  1A 2A 3A 11 C2 0  4A 5A 1S 2S N        S   S    S     TTF S    S
AC2=9  1  1A 2A 3A C1 C2 5  4A 5A 1S 2S N        S   S    S     TTF S    S
AC3=9  9  8  8  X  X  X  6  X  X  X  X  N        S   S    S     TTF S    S
ACT= 1.50
HUT=9  1  X  X  X  X  X  X  X  X  X  X  N        S   S    S     N

STF=1A 2A 3A 4A 5A N                             S   S    S
TTF=1S 2S N
```

9.5.3. DECODER TELEGRAM DATA INPUTS

9.5.3.1. Decoder

DEC = {telegram digits/N} Default = N

9.5.3.2. Parallel decoder

PDE = {telegr. digits/N} Default = N

,SIL = {Y/N} Default = N

9.5.3.3. Clear down decoder

CLD = {telegram digits/N} Default = N

9.5.3.4. Acknowledge decoder

ADE = {telegram digits/N} Default = N
,ACE = {1/2/3/4/5/6/N} Default = N
,REP = {0 - 15} Default = 0
,RTI = {0 - 25.4} Default = 1

```
CQM6000: Software EF-R5.0    EF Field Programmer.  << Input:  SPS=0 >>
-------------------------------------------------------------------------------
Signal-Digits    (RX - Telegrams)                                      FOL

DEC=9  1  1  2  3  2  1  3  0  0  0  0  1  N                          SDE
PDE=9  1  1  2  3  2  2  C1 C2 0  0  0  1  N                          SDE
,SIL=Y
CLD=9  1  1  2  3  X  X  X  X  X  X  X  X  N                          N
ADE=9  1  1  2  3  5  0  0  2  2  2  2  2  N                          N
,ACE=145
,REP=3
,RTI=3.0

SDE=0  1S 2S X  X  X  X  X  X  X  X  X  X  N

-------------------------------------------------------------------------------
ok?   (Yes/No/Menu)
```

The functional decoders are all specified by entering 12 telegram digits and ended by entering "N".
The decoders may be followed by a serial decoder SDE by writing FOL = SDE and defining SDE = {telegram digits}.

9.5.3.4.1. Silent interrogate

,SIL = {Y/N} Default = N

The silent interrogate is a special function which makes it possible for the base station to request a status telegram (AC2) be transmitted by the mobile without opening the loudspeaker and sounding the normal alert signal.
If SIL = Y is specified the AC2 = (telegram) must also be defined. Otherwise an error occurs during prom data calculations.

9.5.3.4.2. Acknowledge expected selector

,ACE = {1/2/3/4/5/6/N} Default = N

The ,ACE subfunction defines on which telegram(s) the acknowledge decoder should be active and expect an acknowledge telegram to be returned by the called station.
The program accepts that one or several encoder telegrams are specified.

ACE = 1	Acknowledge expected on ENC = telegram
ACE = 2	Acknowledge expected on SNC = telegram
ACE = 3	Acknowledge expected on TNC = telegram
ACE = 4	Acknowledge expected on TOF = telegram
ACE = 5	Acknowledge expected on TOE = telegram
ACE = 6	Acknowledge expected on HUT = telegram
ACE = N	Acknowledge not expected (ADE = N)

Example:
Acknowledge telegram expected upon transmission of ENC, SNC and HUT:

Input: ,ACE = 126

Note: All telegrams to which the ACE is referring must be defined using the appropriate function.

9.5.3.4.3. Repetitions

,REP = {0 - 15} Default = 0

The REP= subfunction defines the nuber of retry transmission of the telegram(s) which has been defined under ACE= . The radio always transmits the telegram once and then, if no acknowledge is received, retries at intervals defined by RTI= until acknowledge is either received or the number as defined by REP is reached.

9.5.3.4.4. Repetition time

,RTI = {0-25.4} Default = 1

The RTI= subfunction defines the interval between retry transmissions as defined by REP.
The time is specified in seconds legal range being 0 - 25.4 seconds in 0.1 sec. steps. The minimum time that can be specified must be at least PRE + DUR + length of the expected telegram to be received.

SECTION 10

MIXED TONE SYSTEMS

10. MIXED TONE SYSTEMS

The EF Software provides the option of assigning a tone system specific to a functional or an auxiliary telegram by using the telegram's subfunction identifier ,TON .
If you have assigned a default tone system to the main term identifier TON , all telegrams will use the default tone system except for the telegrams which are assigned otherwise by their subfunction identifier ,TON .
Note that the telegram format for every telegram must obey the rules specific to the signalling system chosen for that telegram.
Note also that if you want to change the signalling system for decoder telegrams you must implement an additional SPS.
The total number of telegrams in all SPS's depends on which systems you are mixing.

Example 1:

Suppose that you have chosen ZVEI 1 as the default tone system by writing
TON = ZV1 and that you want the second encoder telegram
SNC = 1.2.3.4.1A.2A to be transmitted in ZVEI 3:

```
TON          = ZV1
               :
               :
SNC          = 1.2.3.4.1A.2A
    ,TON     = ZV3
```

Example 2:

Assume that the unit must have its decoder code in the ZVEI 1 signalling system. Furthermore, we want the ZVEI 1 telegram 2.4.1A.2A.3A to be transmitted when pushing the [♪] button and the Binary ZVEI telegram Z.2S.9.8.8.1.2.3 when pushing the [A] button.

This set-up is written as

```
TON      = ZV1
           :
           :
ENC      = 2.4.1A.2A.3A
SNC      = Z.2S.9.8.8.1.2.3
  ,TON   = BZV
```

Example 3.

We want a unit with the Binary ZVEI decoder code Z.2S.9.8.8.4.5.6 . Pushing the [♪] button we want to transmit the Binary ZVEI telegram Z.2S.9.8.8.1.2.3 via a repeater requiring the ZVEI 1 telegram 2.4.6.8.0 in order to open. This is done in the following way:

```
TON        = BZV
             :
             :
ENC        = 2.4.6.8.0
   ,TON    = ZV1
   ,FOL    = STF
             :
             :
STF        = Z.2S.9.8.8.1.2.3
             :
             :
DEC        = Z.2S.9.8.8.4.5.6
```

Note that the assignment ,TON = ZV1 applies to ENC only.

SECTION 11

DATA FILE SAVING AFTER DATA ENTRY

11. DATA FILE SAVING AFTER DATA ENTRY

11.1. SAVING ORDER DATA

The data input entered by the operator should be saved on the disk when the last SPS = 3 has been finished.
The program prompts:

Save order data on disk? (Y/N)

and then if "Y" is pressed,

write: Name (without .dta) (filename)

The operator must then enter the filename in which the order data shall be saved.
Pressing [ENTER] without a filename automatically writes a file named TEMP.DTA

When pressing [ENTER] the program displays:

writing Order data <drive:\directory\filename>
... and then calculates the personality prom data.

DATA FILE SAVING AFTER DATA ENTRY

```
*** PROMCALCULATIONS CQM6000-Package EF ***

- GENERAL DEFINITIONS
- RADIO ENVIRONMENT
- KEYBOARD DEFINITION
- AUDIO DEFINITION
- CHANNEL DEFINITION
  Reference-Xtal:    7.400000
- TELEGRAMS
.............
- TELEGRAM-LIST
,,,,,,,,,,,
- ACTION TABLE
- CHANNEL GUARD DEFINITION
- BAK/ID/MFG-QC-SERVICE




Save promdata on disk?    (Y/N)
```

11.1.1. ERRORS AND WARNINGS

During calculation the program verifies that data are valid and if not displays Error messages and warnings. Depending on the type of warning data may be edited before saving the prom data. Prom data are, however, calculated and may be saved.

If an error message is displayed data must always be corrected and a new calculaton performed before saving the data file.

11.2. SAVING PROM DATA

When prom data are ready to be saved the program displays:

Write name? (without .obj) {filename}

The operator must then enter the filename in which the prom data shall be saved.

Pressing [ENTER] without a filename automatically writes a file named TEMP.OBJ. When pressing [ENTER] the program displays:

Writing <drive:\directory\filename>
. . . and returns to the MAIN MENU.

SECTION 12

DISK I/O OPERATIONS

12. DISK I/O OPERATIONS

The (D)isk I/O operation is selected from the MAIN MENU and may be used to save and read data files which have been entered (order data file) or calculated (prom data file).

```
CQM6000: Software EF-R5.0    EF Field Programmer.
------------------------------------------------------------------------------

                              MAIN  MENU
                              ----------




    When you are in "(E)nter data" you can call HELP by pressing <F1>.
------------------------------------------------------------------------------
(E)nter data, (D)isk I/O, (L)ists, (C)odeplug, (S)etup, (T)ransfer, (Q)uit ?
```

Select Disk I/O by pressing (D) and the following prompt displays five options:

```
-----------------------------------------------------------------------------
DISK: (R)ead/(W)rite orderdata, (G)et/(P)ut promdata or (M)enu ?
```

Press:	To:
R	Read an order file
W	Write order data entered
G	Get prom data file (read)
P	Put prom data (save)
M	Return to Main Menu

12.1. READ AN ORDER FILE (R)

Prompt:

File to be read? (without .dta) {Filename}

Enter without a filename will read the default file TEMP.DTA.

The entered filename must exist on the disk and in the selected directory. Otherwise a - Disk read error - message is displayed.
If this occurs press [ENTER] and, when the Main Menu is displayed select Setup to change disk drive and/or directory.

If the file exists the program displays a reading message:
Reading <drive:\directory\filename> . . . and then prompts:

Calculate prom? (Y/N)

Press (Y) to calculate the prom data.

While calculating the program displays the calculating procedures being performed and, if an error is found displays either an error message or warning.

Press (N) to return to the Main Menu without calculating prom data.

12.2. WRITE ORDER DATA (W)

Prompt:

Save order data on disk? (Y/N)

Press (Y) to proceed or (N) to return to the Main Menu.

Press (Y)

Prompt:

Write: Name? (without .dta) {filename}

Enter without a filename will write the default file TEMP.DTA.

The entered filename must be valid; if not the program displays the error message:

<unable to write order data to disk>.

While writing the file the program displays:

Writing <drive:\directory\filename>

. . . and then returns to the Main Menu.

12.3. GET PROM DATA (G)

Prompt:

File to be read? (without .obj) {filename}

Enter without a filename will read the default file TEMP.OBJ

The entered filename must exist on the disk and in the selected directory. Otherwise a - Disk read error - message is displayed.

If this occurs press [ENTER] and, when the Main Menu is displayed select Setup to change disk drive and/or directory.

If the file exists the program displays a reading message:

Reading <drive:\directory\filename>
. . . and then returns to the Main Menu.

12.4. PUT PROM DATA (P)

Prompt:

Save prom data on disk? (Y/N)

Press (Y) to proceed or (N) to return to the Main Menu.

Press (Y)
Prompt:

Write: Name? (without .obj) (filename)

The entered filename must be valid; if not the program displays the error message:

<unable to write prom data to disk>

While writing the file the program displays:

Writing: <drive:\directory\filename>.

SECTION 13

LISTING A DATA FILE

13. LISTING A DATA FILE

The Main Menu option (L)ists provides routines for listing the current order and prom file on either a printer or the screen.

When (L)ists is selected the system prompts:

LISTS: on (P)rinter, on (S)creen or (M)enu.
Press (P) for printer
Press (S) for screen
Press (M) to return to the Main Menu.

13.1. LISTING ON PRINTER (P)

Note:
This option can only be used if a printer is connected to the computer. The printer MUST be turned on and selected. Otherwise an unrecoverable error may exist and terminate the program.

When the (L)ist (P)rinter is selected the program prompts:

LIST what? (O)rder data, (P)rom data or (M)enu.

Example: (L)ists (P)rinter (O)rder data.

```
*** Listing of Orderdata ***

Date : 1988 / 3 / 18

First comment line
Second comment line
Third comment line

TYP:CQM6112S25CxL  OPT: AO BO CO EF GO HA  CB60  F-Nr:F8016M000001
CNU:0001  IOL:1  ODA:1 ,TIO:N  CDI:2  GTE:N  CGG:N   RPL:N
MIV:0  MAV:8  DEV:N  GCV:P  ACA:6 ,ALT:1.0  AFB:Y

Chf TNo TX-Frequen. RX-Frequen. CGEfrq CGDfrq Pow Plg SPS CGE/CGD
-------------------------------------------------------------------
1    0  150.000000  150.000000  N      N      N   N   0   F   F
2    1  156.000000  156.000000  N      N      N   N   1   F   F
3    2  156.025000  156.025000  100.0  100.0  N   N   0   0   0
4    2  156.025000  156.025000  103.5  103.5  N   N   1   1   1

*** SPS=0 ***
ADI:5  SDI:2
PRI:N ,BDT:30 ,MAT:Y ,MAC:N
PTA:0 ,PLG:N   TKA:0 ,PLG:N   SKA:0 ,PLG:N   CCT:N
TON:BEE ,PRE:S ,DUR:S ,BAS:Y ,PAU:3 ,DTM:N
GRP:F ,POS:678 ,BDT:3
ENC:=9   1S  1A  2A  3A  2   2   4A  5A  C1  1   0
 ,Fol1=STF  ,Pre1=S  ,Dur1=S
 ,Fol2=TTF  ,Pre2=S  ,Dur2=S
SNC:=9   1   1A  2A  3A  1   4   1   4A  5A  C1  1
 ,Fol1=STF  ,Pre1=S  ,Dur1=S
 ,Fol2=TTF  ,Pre2=S  ,Dur2=S
TNC:=N
```

The listing is a printout of the hardware and EF software options which are currently stored in the computer memory.

When finished listing the program returns to the menu:

LIST what? (O)rder data, (P)rom data or (M)enu.

LISTING A DATA FILE

Example: (L)ists (P)rinter (P)rom data.

```
*** Promdata ***

Gener. Def.: 0000H
10 80 65 00 01 00 FF FF C0 20 C0 40 FF FF C1 00
C0 A0 C7 00 C7 C0 FF FF FF FF FF FF FF FF FF FF

Environment: 0020H
C0 27 C0 30 0F 0A 00 07 FF 00 01 06 03 04 FF FF
00 01 01 05 FF FF FF FF FF FF FF FF FF FF FF FF

Keyboard:      0040H
C0 48 C0 61 C0 7A FF FF 01 01 02 03 1D 04 05 06
13 07 08 09 14 0A 0E 0C 0B 10 0D 12 21 0A 00 0A
0F 00 01 02 03 18 04 05 06 19 07 08 09 1A 0A 20
0C 0B 1C 0A 1F 1E 16 00 17 1B 00 0A 0A 0A 0A 0A
0A 0A 13 0A 0A 0A 14 0A 0E 0C 0B 0A 0A 24 22 0A
0A 23 0F FF FF FF FF FF FF FF FF FF FF FF FF FF

Audio:         00A0H
01 80 FF 34 F1 FF F3 02 6B 0A 6C 0A F2 02 F4 1E
F8 0A F6 15 F7 19 EE FF FA 5A F9 02 FD 14 5F 07

Chan.Guard     00C0H
14 03 8B 03 AB FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
06 7E 05 92 FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF

Channels       0100H
C1 0C C2 A0 01 04 02 00 02 00 02 00 01 00 FF 00
02 01 FF 01 03 02 00 00 04 02 11 01 FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF

Synthesizer  02A0H
12 80 17 20 71 E7 41 71 77 01 91 F6 41 91 86 01
91 F6 49 91 86 09 FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF

Telegrams      0500H
0C FB 09 21 11 12 13 02 02 14 15 40 F1 01 00
FB 09 01 11 12 13 01 04 01 14 15 40 F1 01 0C
09 01 11 12 13 02 04 06 14 15 00 00 0C FB 09
11 12 13 01 41 F1 00 14 15 21 22 0C FB 09 01
12 13 40 F1 41 F1 05 14 15 21 22 0C FB 09 09
08 00 00 00 06 00 00 00 00 0C FB 09 01 00 00
00 00 00 00 00 00 00 05 FB 11 12 13 14 15 02
21 22 0D FB 09 01 01 02 03 02 01 03 00 00 00
01 0D FB 09 01 01 02 03 02 02 40 F1 41 F1 00
00 01 0D FB 09 01 01 02 03 F0 F0 F0 F0 F0 F0
F0 0D FB 09 01 01 02 03 05 00 00 02 02 02 02
0D FB 00 A1 A2 F0 F0 F0 F0 F0 F0 F0 F0 F0 F0
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF

Tel.Lists      0600H
00 03 00 00 35 00 67 00 35 00 6E 00 35 00 03
00 35 00 67 00 35 00 6E 00 35 00 03 1E 00 35
67 00 35 00 67 00 35 00 03 2C 00 35 00 67 00
00 6E 00 35 00 03 3B 00 35 00 67 00 35 00 6E
35 00 03 4B 00 35 00 67 00 35 00 6E 00 35 00
59 00 35 00 03 72 1C 35 00 B0 1C 35 00 B0 1C
00 03 81 1C 35 00 B0 1C 35 00 B0 1C 35 00 01
00 35 00 01 A1 00 35 00 FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF

Action         0700H
C6 C5 FF FF C0 C0 C6 C0 C6 E0 C7 12 C7 3A FF
FF FF 40 05 FF FF 02 FF 14 4F 1E 03 00 FF 1E
00 1E 03 FF 96 07 00 1B 01 0E 00 54 9F 28 61
35 6E B3 42 73 38 00 4F 00 00 00 00 FF FF 00
14 D5 FF FF 00 FF FF 00 00 0A 00 FF 0F 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF

BAK-Table      06C0H
38 9F 9F 38 3B 38 B3 38 38 B9 38 38 38 38 38
38 AF AF 38 3B 38 B3 38 38 B9 38 38 38 38 38

Identity       06E0H
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF

Manufact       07C0H
31 39 4A 37 31 30 34 36 35 2D 2D 2D 46 38 30
36 4D 30 30 30 30 30 31 FF FF 88 01 FF FF 61
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
20 20 20 20 20 20 20 20 20 20 20 20 20 20 20
```

13.2. LISTING ON SCREEN (S)

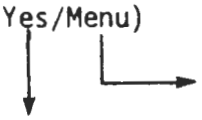
When (L)ists (S)creen is selected the program prompts:

LIST what? (O)rder data, (P)rom data or (M)enu.

Example: (L)ists (S)creen (O)rder data.

```
*** Listing of Orderdata ***

First comment line

Second comment line

Third comment line

TYP:CQM6112S25CxL  OPT: A0 B0 C0 EF G0 HA  CB60  F-Nr:F8016M000001
CNU:0001  IOL:1  ODA:1 ,TIO:N  CDI:2  GTE:N  CGG:N   RPL:N
MIV:0  MAV:8  DEV:N  GCV:P  ACA:6 ,ALT:1.0  AFB:Y
```

```
Continue?    (Yes/Menu)
```



Return to Main Menu

```
*** SPS=0 ***
ADI:5  SDI:2
PRI:N ,BDT:30 ,MAT:Y ,MAC:N
PTA:0 ,PLG:N   TKA:0 ,PLG:N   SKA:0 ,PLG:N   CCT:N
TON:BEE ,PRE:S ,DUR:S ,BAS:Y ,PAU:3 ,DTM:N
GRP:F ,POS:678 ,BDT:3

Continue?    (Yes/Menu)
```

When the last page is listed the program returns to the menu:

LIST what? (O)rder data, (P)rom data or (M)enu.

Example: (L)ists (S)creen (P)rom data.

```
*** Promdata ***

Gener. Def.: 0000H
10 80 65 00 01 00 FF FF C0 20 C0 40 FF FF C1 00
C0 A0 C7 00 C7 C0 FF FF FF FF FF FF FF FF FF FF


Environment: 0020H
C0 27 C0 30 0F 0A 00 07 FF 00 01 06 03 04 FF FF
00 01 01 05 FF FF FF FF FF FF FF FF FF FF FF FF


Keyboard:    0040H
C0 48 C0 61 C0 7A FF FF 01 01 02 03 1D 04 05 06
13 07 08 09 14 0A 0E 0C 0B 10 0D 12 21 0A 00 0A
0F 00 01 02 03 18 04 05 06 19 07 08 09 1A 0A 20
0C 0B 1C 0A 1F 1E 16 00 17 1B 00 0A 0A 0A 0A 0A
0A 0A 13 0A 0A 0A 14 0A 0E 0C 0B 0A 0A 24 22 0A
0A 23 0F FF FF FF FF FF FF FF FF FF FF FF FF FF


                         Main Menu
Continue?    (Yes/Menu)
```

```
Keyboard:     0040H
C0 48 C0 61 C0 7A FF FF 01 01 02 03 1D 04 05 06
13 07 08 09 14 0A 0E 0C 0B 10 0D 12 21 0A 00 0A
0F 00 01 02 03 18 04 05 06 19 07 08 09 1A 0A 20
0C 0B 1C 0A 1F 1E 16 00 17 1B 00 0A 0A 0A 0A 0A
0A 0A 13 0A 0A 0A 14 0A 0E 0C 0B 0A 0A 24 22 0A
0A 23 0F FF FF FF FF FF FF FF FF FF FF FF FF FF


Audio:        00A0H
01 80 FF 34 F1 FF F3 02 6B 0A 6C 0A F2 02 F4 1E
F8 0A F6 15 F7 19 EE FF FA 5A F9 02 FD 14 5F 07

Chan.Guard    00C0H
14 03 8B 03 AB FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
06 7E 05 92 FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF

Continue?    (Yes/Menu)
```

Menu → Main Menu

Yes ↓

```
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF


Channels      0100H
C1 0C C2 A0 01 04 02 00 02 00 02 00 01 00 FF 00
02 01 FF 01 03 02 00 00 04 02 11 01 FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF

Continue?    (Yes/Menu)
```

Menu → Main Menu

Yes ↓ NEXT SCREEN

SECTION 14

CODE PLUG PROGRAMMING

14. CODE PLUG PROGRAMMING

The Stornophone 6000 EF personality program can be used to calculate data for code plugs.

This option is selected from the Main Menu, option (C)ode plug and the Code Plug Menu is displayed:

(D)efaults, (E)nter data, (S)store data, (L)oad data or (M)enu.

Press:	to:
D	Set data to defaults
E	Enter data
S	Store data (disk file)
L	Load data (disk file)
M	Return to Main Menu

14.1. DEFAULTS (D)

Pressing (D)efaults resets data already being entered to the default values as defined in the code plug nomenclature.

14.2. ENTER DATA (E)

```
CQM6000: Software EF-R5.0    EF Field Programmer.      << Codeplug J709581G5 >>
-------------------------------------------------------------------------LPT-------
CNU= 0001
CGE= N
CGD= N

CH1= 1                 1   2   3   4   5   6   7   8   9  10  11  12  13  14
CH2= 2                 1   2   3   4   5   6   7   8   9   N   N   N   N   N
CH3= N
CH4= N                15  16  17  18  19  20  21  22  23  24  25  26  27  28
CH5= N                 N   N   N   N   N   N   N   N   N   N   N   N   N   N
CH6= N
CH7= N
CH8= N
CH9= N

-------------------------------------------------------------------------------
Syntax: 0^1^2^3^4^5^6^7^8^9^A^B^C^D^E^F^N^  Default: N
```

14.2.1. DATA INPUT

14.2.1.1. Code plug number

CNU = {1 - 9999}

The code plug number must be identical to the code plug number in the radio's personality prom.

14.2.1.2. Channel guard (CTCSS) decoder

CGD = {Tone number/N} Default = N

Programming a channel guard decoder tone in the code plug requires that CGD = CS in the radio's personality prom.

14.2.1.3. Channel guard (CTCSS) encoder

CGE = {Tone number/N} Default = N

Programming a channel guard encoder tone in the code plug requires that CGE = CS in the radio's personality prom.

14.2.1.4. Code plug released channels

CH1 - CH9 = {Channel number/N} Default = N

Programming a channel to be released by inserting the code plug requires that the subfunction ,PLG related to CHF = {Channel number} is programmed ,PLG = Y.

14.2.1.5. Code plug tone digits

C1 - C28 = {Tone number/N} Default = N

Maximum 28 tone digits in the tone telegrams may be programmed in the code plug.

Each digit may be part of a telegram or several telegrams and the tone number to be programmed must belong to the tone system used by the telegram.

All tones not used must be programmed Cxx = N.

14.2.2. CONTENTS OF CODE PLUG

```
CQM6000: Software EF-R5.0    EF Field Programmer.      << Codeplug J709581G5 >>
-------------------------------------------------------------------LPT-------
CNU= 0001
CGE= N
CGD= N

CH1= 1                 1   2   3   4   5   6   7   8   9  10  11  12  13  14
CH2= 2                 1   2   3   4   5   6   7   8   9   N   N   N   N   N
CH3= N
CH4= N                15  16  17  18  19  20  21  22  23  24  25  26  27  28
CH5= N                 N   N   N   N   N   N   N   N   N   N   N   N   N   N
CH6= N
CH7= N
CH8= N
CH9= N
           Content of Plug: 0  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15
                            ----------------------------------------------
                            00 01 00 64 00 01 FF FF 02 01 02 FF 12 34 56 78
                            9F FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF


-------------------------------------------------------------------------------
 (E)dit, (C)odeplug-menu or (M)ain-menu
```

When all data have been entered the contents of the code plug is automatically calculated and displayed. Optionally the data may be edited, (E)dit, or data can be stored if returning to (C)ode plug menu. Pressing (M)ain Menu returns to the Main Menu.

14.3. STORE CODE PLUG DATA (S)

Prompt:

Write: Name? (without .plg) {Filename}

Enter without filename automatically writes the file TEMP.PLG.

The filename must be legal or the error message:

Can not write to disk!

is displayed and pressing a key returns to at the code plug menu.

14.4. LOAD DATA (L)

Prompt:

Read: Name? (without .plg) (Filename)

Enter without filename automatically reads the default file TEMP.PLG.

If the filename does not exist or is illegal the error prompt:

- - - wrong filename - - -

is displayed.

The code plug file may be accessed by a code plug programming device.

SECTION 15

TRANSFER DATA

15. TRANSFER DATA

The personality prom file stored in the computer memory may be transfered to a prom programmer or to a Programming and Test Service Instrument (PATSI) using the (T)ransfer routine.

Prompt:

TRANSFER: (P)atsi, (D)ata io, (M)enu?

15.1. TRANSFER TO PATSI (P)

Prompt:

Is Control Box installed?

Press (Y)es if the radio to be programmed has a control box installed; otherwise press (N)o.

While transferring data the computer displays:

Computer Busy - Wait.

Note: The personality data must be calculated for a radio with structured option HB (EE prom installed) if the radio is programmed with a PATSI.

15.2. TRANSFER TO DATA I/O

The personality data may be programmed into an Eprom using a DATA I/O 19 or 22 programmer provided that the data have been calculated for a radio with structured option HA (Eprom to be installed).

When pressing (D)ata I/O the following screen is displayed:

DATA OUTPUT TO I/O 19
PRESS SELECT
PRESS D1
PRESS START
HIT ANY KEY ON PC

DATA OUTPUT TO I/O 22
PRESS COPY
PRESS PORT
PRESS RAM
PRESS START
HIT ANY KEY ON PC

The DATA I/O programmer must be on and setup for remote input via the RS-232 port.

Baud rate:	2400
Data Bits:	8
Stop Bits:	2
Parity:	N
Translation Format:	ASCII HEX SPACE