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Faculty of Engineering and Faculty of Computer Science, Universitas Bandar Lampung
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PREFACE

The activities of the International Conference is in line and very appropriate with the vision and mission of the UBL to promote training and education as well as research in these areas.

On behave of the First International Conference of Engineering and Technology Development (ICETD 2012) organizing committee; we are very pleased with the very good responses especially from the keynote speakers and from the participants. It is noteworthy to point out that about 45 technical papers were received for this conference

The participants of conference come from many well known universitas, among others: Universitas Bandar Lampung, International Islamic University Malaysia, University Malaysia Trengganu, Nanyang Technological University, Curtin University of Technology Australia, University Putra Malaysia, Jamal Mohamed College India, ITB, Mercu Buana University, National University Malaysia, Surya Institute Jakarta, Diponogoro University, Unila, Universitas Malahayati, University Pelita Harapan, STIMIK Kristen Newmann, BPPT Lampung, Nurtanio University Bandung, STIMIK Tarakanita, University Sultan Ageng Tirtayasa, and Pelita Bangsa.

I would like to express my deepest gratitude to the International Advisory Board members, sponsors and also welcome to all keynote speakers and all participants. I am also grateful to all organizing committee and all of the reviewers which contribute to the high standard of the conference. Also I would like to express my deepest gratitude to the Rector which give us endless support to these activities, such that the conference can be administrated on time.

Bandar Lampung, 20 Juni 2012

Mustofa Usman, Ph.D
ICETD Chairman

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MORSE CODE TRANSLATOR APPLICATIONS BASED ON COMPUTER USING RADIO TRANSMISSION

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Abstract— **Development of information technology today is growing very rapidly. It can be seen from the increasing sophistication of technology used to process and get information. However, not all information may be known by the general public, because there is confidential information. So that confidential information can only be known and understood by a particular party.**

The method used to secure confidential information may include an encryption technique. With this technique encoded information into an information can not be read or is known by parties who are not interested. One form of Morse code is a password that can be used to send confidential information.

Along with this there was made an application that serves to translate the code - Morse code, so users no longer need to send and interpret the code - the conventional Morse code. To make the application required the application software that supports and is compatible with applications that will be made and also needed a trainer for testing radio Morse code input. If the application can pass the test with good

results, it can be used as an application of Morse code translator.

Keywords: translator, Morse code, encryption technique

I. Introduction

Development of information technology today is evolving so rapidly. It can be seen from the increasingly sophisticated technology used to process and get information. However, not all information may be known to the general public, because there is information that is highly confidential. So that confidential information can only be known and understood by a particular party.

In connection with the confidential information, is closely associated with an area of waters of Indonesia which is a very strategic area for international trade route, because it lies between two continents. Associated with it, the security of the waters of Indonesia became a very important aspect. One way is by sending a security patrol boats for security and surveillance. For coordination between the ship or with ground stations, of course, necessary that confidential communications media, one of which uses radio transmissions Morse code.

Morse code signal communication is very effective especially in speech communication in times of emergency communications (voice) do not allow for many reasons. However, understanding the user communicates with morse communication tool is absolutely necessary. Because communication using Morse code would be in vain if the operator does not understand the Morse code.

But obstacles do not stop there. Auditory acuity and stability of the delivery of each operator to decode Morse code, particularly the recipients have different saturation levels. So that will affect the accuracy of the transmit and receive information via morse transmissions that can cause an error writing the characters, words or even sentences. The perpetrators of these communications via Morse transmission in desperate need of a high concentration in order to avoid an error writing the Morse code sound is heard and written. This often occurs when the direct writing using a typewriter (keyboard). So the news or information transmitted by the received not the same.

Based on the background of the above problems, we need a system that can provide solutions to existing problems. How information can be sent by Morse code and translated properly by the system. In the discussion of this issue is implementation defined codes Morse code translator based computers.

Associated with problems that have been presented, then the restrictions imposed in this study is the exchange of information using Morse code Morse code translator applications. Information by Morse code sent from the sending station (transceiver) to the analog signal and can be accepted by a receiving station that has a frequency equal to the transmitting station (transceiver). The discussion in this study did not include estimates of the elements - the physical elements such as hardware specifications, detailed and non-physical elements such as the size of the emission frequency and emission problems caused by nature such as bad weather.

II. BASIS OF THEORY

A. Sandi Morse coding system

Known by the slogan "one world one language, Morse code is the language" to show that Morse code is a universal language. It radio regulation 1998 article S.25.5 paragraph S.25, states that (in free translation): "any person who intends to obtain a license to operate the amateur radio station must prove his ability to send and receive by hand by ear texts in Morse code signals correctly ".

Morse code signal communication is very effective especially in emergency communications in times of speech communication is relatively difficult because of various reasons. For example, when poor propagation or at the time of communication can only be served with a small bercatudaya devices.

SOS call for help sounded to be "in-di-di-dah-dah-dah-di-di-

di" is often heard when watching old war movies. Morse code signal is voiced only in the two types of elements that is "in" to express a point (dot) and "dah" to voice a line (dash). Sound "dah" is pronounced as "DAA", the letter "h" is pronounced. Most of the introduction to learn Morse code alphabet, as the process of learning to recognize that the recall. Number 0 (zero) to 9 (nine) or perhaps more accurately "than the numbers 1 through 0", can be learned more quickly because each of them equally composed of 5 elements of Morse code. Have a look, the number "1" begins with an "in" the rest "dah" in number 5 elements, the number "2" begins with two "at" rest "dah" numbers are still five elements, and so on culminating in the number "5" with five "on". Then turn first to a "dah" rest "in" the number "6", and so on culminating in the number "0" into five "dah".

Morse is the language of sound, "dit" is a short beep and "dah" is a long sound. How long the length of the sound and how long the spaces? For guidance in tapping or sending Morse code is a ratio and spacing. These guidelines only as a guide only. Regular exercise is necessary to produce beats with perfect ratios and space.

The ratio of "dot - dash - element spacing - character spacing - spacing word" is "1 - 3 - 1 -3 - 7". Spacing between elements of the "dah" with "at" in the alphabet (letters) are 1 (one) tap. Spacing between both alphabetic characters (letters) and numbers (numbers) in one word is 3 (three) tap. Spacing between words is 7 (seven) tap. Length ratio of the sound "dah" is equal to 3 (three) times the long sound "in". Spacing between the alphabet is 1 (one) "dah" and a space between two words is 2 (two) "dah". These can all be changed in accordance with agreements between operators Morse (as long as recognizable morsenya code), but this is generally applicable.

Although Morse is the language of sound, but in certain circumstances, for example at night, can also be sent with a flashlight (flashlight) which turned out based on the ratio and the space above, in order to transmit Morse code. Delivery using a flashlight should pay attention to the distance between the sender and the recipient.

For more on the coding system can be viewed in morse in the table below.

	fonetik	bunyinya		fonetik	bunyinya
1	one	di-dah-dah-dah-dah	6	six	dah-di-di-di-dit
2	two	di-di-dah-dah-dah	7	seven	dah-dah-di-di-dit
3	three	di-di-di-dah-dah	8	eight	dah-dah-dah-di-dit
4	four	di-di-di-di-dah	9	nine	dah-dah-dah-dah-dit
5	five	di-di-di-di-dit	0	zero	dah-dah-dah-dah-dah

Table 1.Morse Code For Numbers

ABJAD

	fonetik	bunyinya		fonetik	bunyinya
A	alpha	di-dah	N	november	dah-dit
B	bravo	dah-di-di-dit	O	oscar	dah-dah-dah
C	charlie	dah-di-dah-dit	P	papa	di-dah-dah-dit
D	delta	dah-di-dit	Q	quebec	dah-dah-di-dah
E	echo	dit	R	romeo	di-dah-dit
F	foxtrot	di-di-dah-dit	S	sierra	di-di-dit
G	golf	dah-dah-dit	T	tango	dah
H	hotel	di-di-di-dit	U	uniform	di-di-dah
I	india	di-dit	V	victor	di-di-di-dah
J	juliet	di-dah-dah-dah	W	whiskey	di-dah-dah
K	kilo	dah-di-dah	X	x-ray	dah-di-di-dah
L	lima	di-dah-di-dit	Y	yankee	dah-di-dah-dah
M	mike	dah-dah	Z	zulu	dah-dah-di-dit

Table 2. Morse code for the alphabet

NUMBER

	fonetik		bunyinya		fonetik		bunyinya
.	titik	AAA	di-dah-di-dah-di-dah	'	tanda petik	WG	di-dah-dah-dah-dah-dit
,	koma	MIM	dah-dah-di-di-dah-dah	"	tanda kutip	AF	di-dah-di-di-dah-dit
?	tanda tanya	IMI	di-di-dah-dah-di-di	:	titik dua	OS	dah-dah-dah-di-di-dit
/	garis miring	DN	dah-di-di-dah-dit	;	titik koma	KR	di-dah-di-dah-di-dit
-	garis datar	DU	dah-di-di-di-di-dah	+	tanda tambah	AR	di-dah-di-dah-dit
_	garis bawah	IQ	di-di-dah-dah-di-dah	=	sama dengan	BT	dah-di-di-di-dah
(	kurung buka	KN	dah-di-dah-dah-dit	*	clear	SK	di-di-di-dah-di-dah
)	kurung tutup	KK	dah-di-dah-dah-di-dah	>	tanda mulai	KA	dah-di-dah-di-dah
$	tanda dolar	SX	di-di-di-dah-di-di-dah	#	tanda salah	HH	di-di-di-di-di-di-dit

Table 3. Morse code for Punctuation

B. Ttype of alert (Signal)

Basic telecommunications system is a hint. Cues that flow from one place to another can form analog or digital signal.

1. Analog signaling

Analog signaling is often called a continuous signal, because the shape of a continuous wave, which carries information by changing the characteristics of the wave. Analog cue has a characteristic that has an amplitude and frequency. If related to the sound, the wave height is determined by the amplitude, which determines whether or not loud voice, while the frequency determines the number of cycles in a second wave, which has implications for the loudness of the sound (screeching or not). In the analog signal, the amplitude value at any time change – change
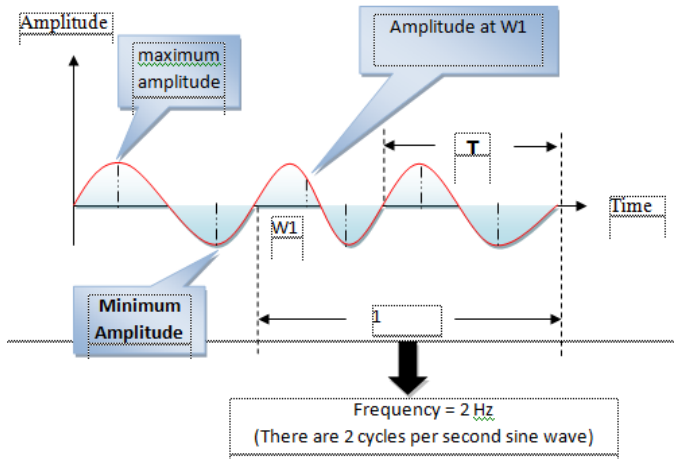
Figure 1. Amplituodo and frequency of the analog signal

In the example above, the signal frequency of 2 Hz, given in every second there are two cycles of a sine wave. The period (T) is defined as the time required by a sine wave and has a relationship with f as follows:

T = 1 / f
Thus, T in the above example as follows:
T = 1/2 seconds

2. Digital cues
Digital signaling also called discrete cues. This cue is made up of two states, called bits, which is a state 0 and state 1.
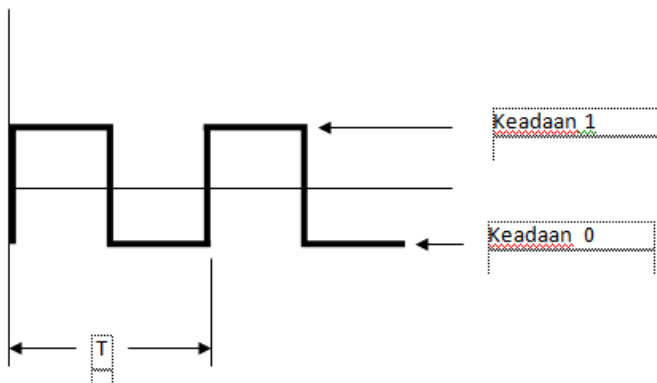

Figure 2. Represents the square wave digital signal

State 1 can be obtained by such a voltage is represented by +5 volts and 0 state is represented by 0 volts.

C. Exchange of Analog and Digital Signals
In practice, the communication between devices may experience a change from analog to digital signals and vice versa. For example, two computer communication networks involving telephone, make the following changes sign. The first computer then sends a digital signal by the modem device is converted into analog signals. Analog signaling is flowing in the telephone network. Furthermore, the analog signal is converted by the modem into a digital signal at the receiver.
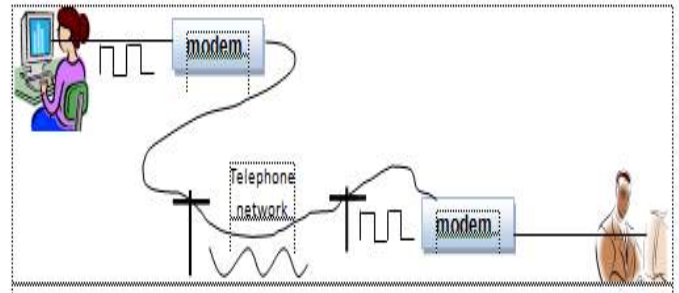

Figure 3. Exchange cue analog to digital

D. Direction Transmission
Two devices that communicate can have one of three possible directions of transmission are:

1. simplex
Direction of transmission is only possible signal flows in one direction. A common example of this is television, which transmits signals from television stations to a TV antenna. In this situation, there is no signal coming back from TV to TV stations.
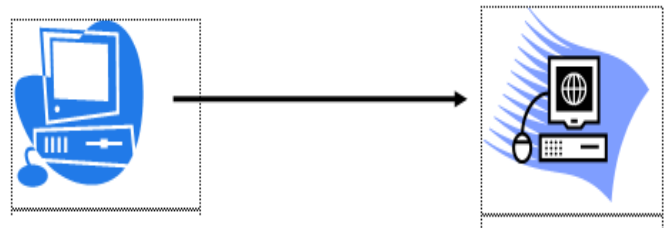
Figure 4. One-way relationship

2. Half-duplex
Two-way relationship that can only be done alternately. Direction of transmission such as this can be analogous to an emergency road vehicle that can be passed from two directions but not simultaneously. Examples of communications that use such models are currently on Handle-Talkie.
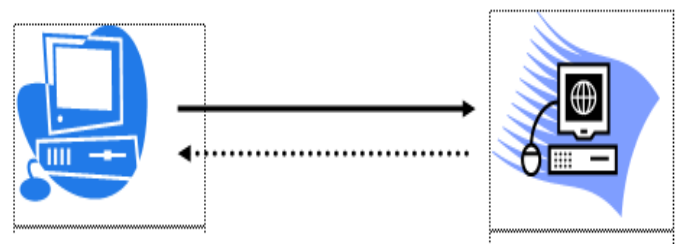

Figure 5. Two-way relationship, in turn

3. Full-duplex
Two-way relationship that can be performed

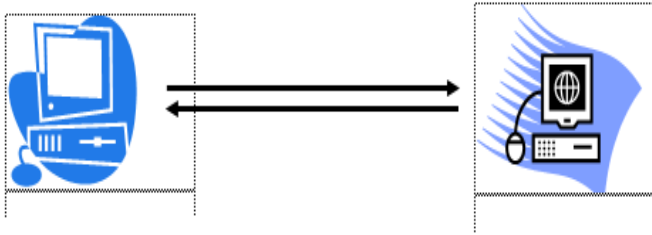simultaneously. Such models can be analogous to two-way street. Examples are telephone and cellular phone.

Figure 6. Two-way relationship *(full-duplex)*

III. SYSTEM DESIGN

A. System Block Diagram

The software application designed with several closely related sub-systems are connected in an integrated manner to be able to function as a Morse code translator using radio transmission with a good and accurate.

1. Input module

Module is a set of keyboard input which mediates the user to include characters or letters which are then sent to the processor to generate Morse code.

2. Process module

Process module is the main processing system that functions to process the data input into morse code sound which will then be transmitted over the radio.

3. Output module

Output module is a device used to display the input characters are processed. This module serves as a liaison between applications designed with its users. With this module users can see through the monitor text messages sent or received from the translation of Morse code sound. User can see the view menu so that it can use the application properly.
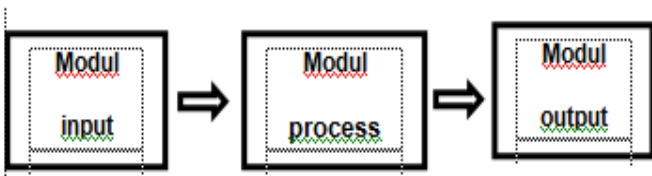

Figure 7. System Block Diagram

B. Principles of Systems

An application was made to be used in accordance with its function. These applications are used to translate Morse code radio transmission via computer-based, of course, its use is necessary to understanding the working principle and function of the application. The working principle of the details of the application system designed is as follows:
• input module detects input from the keypad presses made by

the user. Imputan was processed and interpreted by the processor module.
• After the data processing is complete, then the Morse code signal is displayed on the application within outputan module (monitor) the form of light text or characters that can be read directly by the user (the user).
• In addition, the voices of Morse code generated will be transmitted using the sound card on the PC to the radio system.
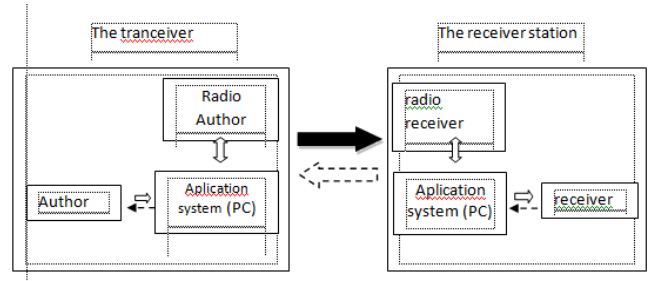

Figure 8. Analysis of system design requirements

In the figure 8, describes the analysis of the needs of the new system is designed and developed to facilitate the translation of information using Morse code radio trasmisi to obtain precise results quickly and accurately.

C. Hardware Configuration

There are some hardware that is an important factor supporting Morse code translator application can be made as well as functioning properly in accordance with the expected goals. Some hardware devices are radio, morse key, personal computer (PC).
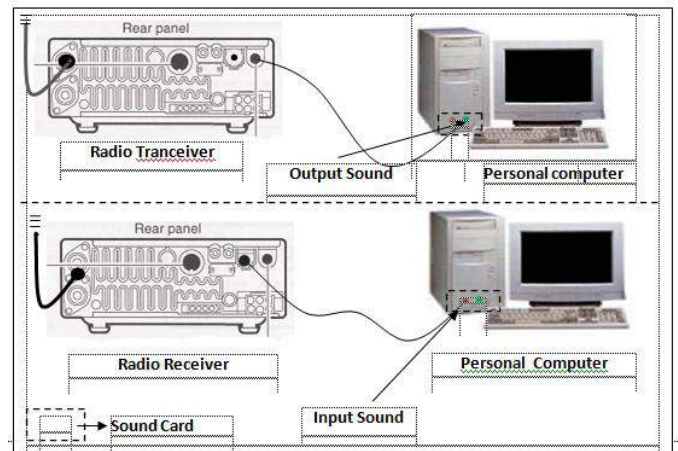
Figure 9. Hardware configuration

D. Recording Code Sandi Morse code

In order for applications to function translates information sent via Morse code, the code must be entered the sound code Morse code into the system by performing the recording of each - each Morse character and saved with the extension *. Wav. It is intended for the sound of each Morse code short duration, then the extension. Wav will be easier for the declaration in writing of the application program despite the fact that other extensions can also be used.

Figure 12. Sandi Morse code recording

E. Designing Software

Software design process is an essential part of the Morse code translator system. Before the programming process step to do is create a flow chart of the program will be made. Morse encoder program designed to convert a message in the form of Morse code signals are transmitted or received over the radio into unreadable characters. Each morse signal is defined to be a series of letters to form words or sentences. The following flow chart can be seen morse encoder program.
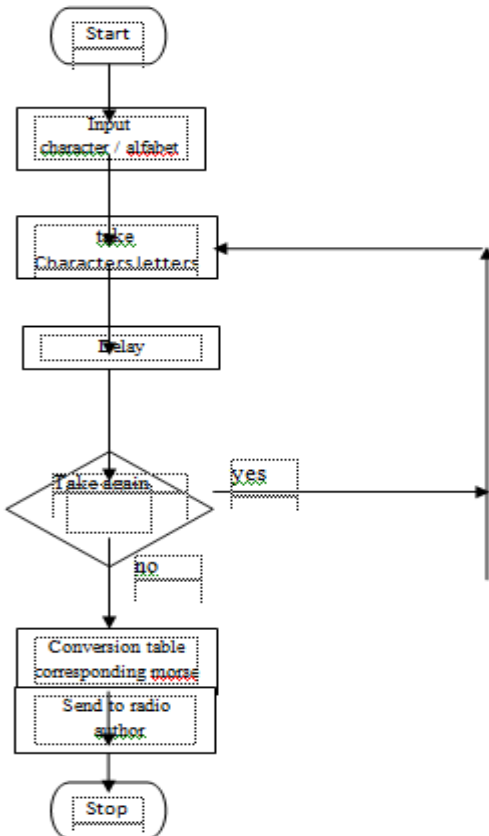
1. The sender application

Figure 13. Flow diagram of the sending application program
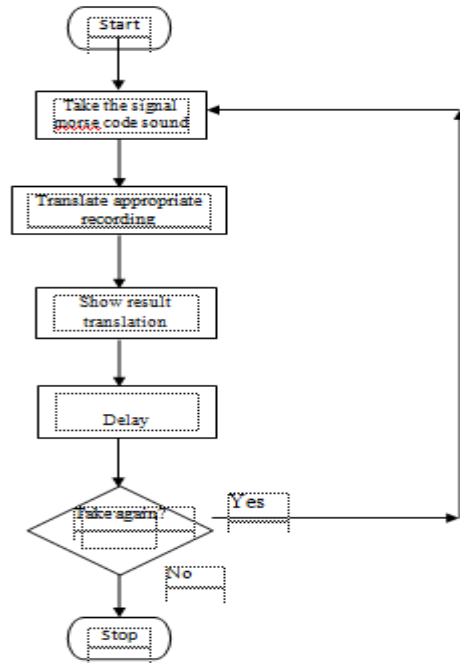
2.   application receiver

Figure 14. Flow diagram of the receiving application program

IV. IMPLEMENTATION AND DISCUSSION

In this section we explain the appearance of the application specification, implementation and testing of applications made. Testing of such applications include the testing of the reliability program and test the validity of the program. While the trial included lab experiments and experiments outside the lab is focused on operational equipment.

 A.   Specifications Display Applications
      Specifically, the application consists of multiple views of inter-related and form into a coherent whole in a single application.

 1.   form Load
Form Load is the first appearance of the form that appears when the application is run and the Morse code translator is a link to display the application's main form.
The following program listing and explanation of the form load of the program are made.

```
Private Sub cmdYA_Click()
    MsgBox " Selamat Bekerja Dan Bertugas   " &
            vbCrLf & "          Semoga
            Sukses!!!!! "
    frmterjemahan.Show
    frmMenu.Visible = False
End Sub
-------------------------------
Private Sub CmdTdak_Click()
```

```
End
End Sub
Private Sub cmdYA_Click()
```

2. Main form

The main form is the form that became central to the use of Morse code translator application, because in this form code will be translated into Morse code letters or characters unreadable. So the user can immediately find out the contents of the flow of information clearly.
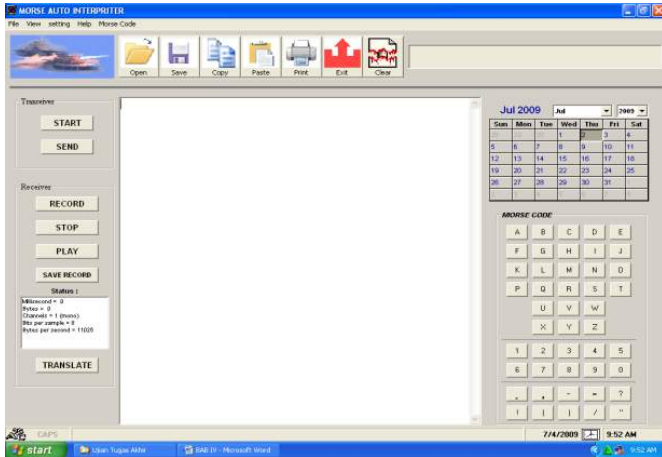

Figure 15. Display the Main Form

Program listings for the sending application
```
Private Declare Function SndPlaySound _
    Lib "winmm" Alias "sndPlaySoundA"(ByVal
     pszSoundName As String,ByVal uFlags As
     Long) As Long
Public Sub PlaySound(NamaFile As String)
    SndPlaySound NamaFile, 1
End Sub
Public Sub PlaySound(NamaFile As String)
    SndPlaySound NamaFile, 1
End Sub
```

Program listings on a declaration to enable non-visual audio files by using the component "winmm" which will be active when the main form is displayed and the sound file is executed

```
Sub BukaDb()
    Set KonekDb = New ADODB.Connection
    StrKonek =
"Provider=Microsoft.Jet.OLEDB.4.0;Persist " _
         & "Security Info=False;Data
Source=" & App.Path + "\Database\Morse.mdb"
    If KonekDb.State = adStateOpen Then
        KonekDb.Close
        Set KonekDb = New ADODB.Connection
        KonekDb.Open StrKonek
    Else
        KonekDb.Open StrKonek
```

```
    End If
    SqlSql = ""
    SqlSql = "SELECT * FROM Morse ORDER BY
Kar_Morse"
    Set Rs_Morse = KonekDb.Execute(SqlSql, ,
adCmdText)
End Sub
```

The program listing berfunsgsi to associate the form with the morse sound database (*. Mdb) as required to match the letters entered with morse sound file that you saved previously.

```
Private Sub TbA_Click()
    Dim Putar As Integer
    PlaySound App.Path & "\karakter\A.wav"
    ProgressBar1.Min = 0
    ProgressBar1.Max = 10000
    ProgressBar1.Visible = True
    ProgressBar1.Value = ProgressBar1.Min
    For Putar = ProgressBar1.Min To
ProgressBar1.Max
    ProgressBar1.Value = Putar
    Next Putar
    ProgressBar1.Value = ProgressBar1.Min
    TxtPesan.Enabled = True
    TxtPesan.SetFocus
    TxtPesan.Text = "A"
End Sub
- - - - - - - - - - - - - - - - - - - - - - - - - - - - -
Private Sub TbB_Click()
    PlaySound App.Path & "\karakter\B.wav"
    Dim Putar As Integer
    ProgressBar1.Min = 0
    ProgressBar1.Max = 10000
    ProgressBar1.Visible = True
    ProgressBar1.Value = ProgressBar1.Min
    For Putar = ProgressBar1.Min To
ProgressBar1.Max
    ProgressBar1.Value = Putar
    Next Putar
    ProgressBar1.Value = ProgressBar1.Min
    TxtPesan.Enabled = True
    TxtPesan.SetFocus
    TxtPesan.Text = "B"
End Sub
```

When the character A is clicked it will be called the sound file a.wav accordance with the table in the database Morse and Morse code sound will be played the character A, except that the object will be displayed TekBox letter A.

3. Program listings for receiving applications

Figure 16. Display buttons recipient

```
Private Sub Form_Load()
    i = mciRekam(" close all", 0&, 0, 0)
    ' Membuka  file wav dengan MCI Command....
    i = mciRekam("open new type waveaudio " _
                 & "alias capture", 0&, 0, _
0)
    With Me
        .AutoRedraw = True
        .DrawStyle = vbInsideSolid
        .DrawMode = vbCopyPen
        .ScaleMode = vbPixels
        .DrawWidth = 2
        .ScaleHeight = 256
    End With
End Sub
```

In the picture above is part of the receiving application found on the main form. Program listings on a declaration to activate the recording function of sound emitted from the sender. At the main form is displayed then the declaration will be called and ready to run when the record button is clicked.

When the button is clicked then translate the translation will be displayed on the object TexBox accordance with the letters listed in the table in the database Morse.

4. Operator Data Form

Operator Data Form is a form that serves as a display of user data storage applications Morse code translator in detail.
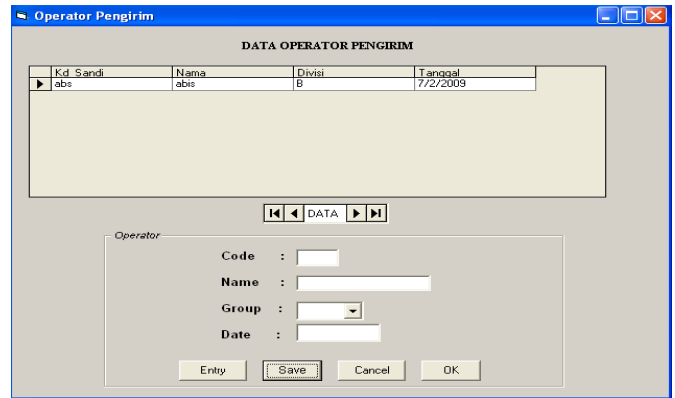

Figure 17. Operator Data Form

```
Private Sub cmdstart_Click()
    If TxtPesan.Text = "" Then
    MsgBox "Please insert your name!",
vbCritical, "Info!"
        FrmOpr.Show
    Exit Sub
    End If
    TxtPesan.Enabled = True
    TxtPesan.SetFocus
    FrameCode.Enabled = False
    Call BERSIH
End Sub
```

In the program listing above explaining when the start button located on the main form is clicked it will display the order form to fill out user data. Once the user data is stored charged and then TexBox found on the main form will be in a condition ready to be used to input messages or information.

5. Print form

Form Print a form that will display the print setup of the document to be printed to the printer at once form to run a command for printing a document in accordance with predetermined specifications.
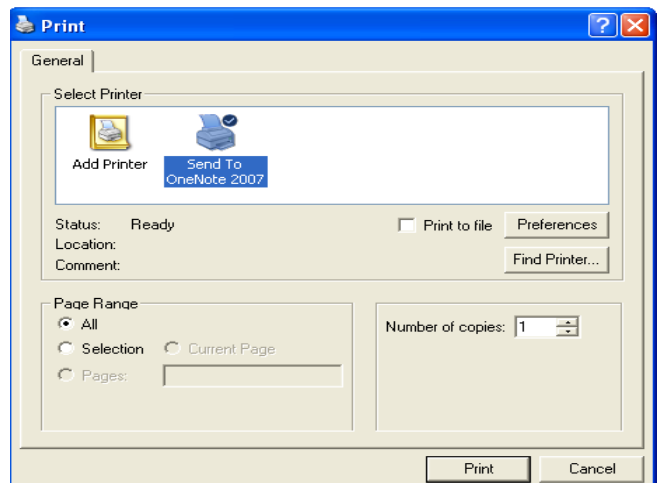
Figure 18. Display Form Print

6.   File form

File Form is a form that will appear when an event occurs click on the menu open. This form displays a dialog box that contains the folders and files - files that are stored and will be open.
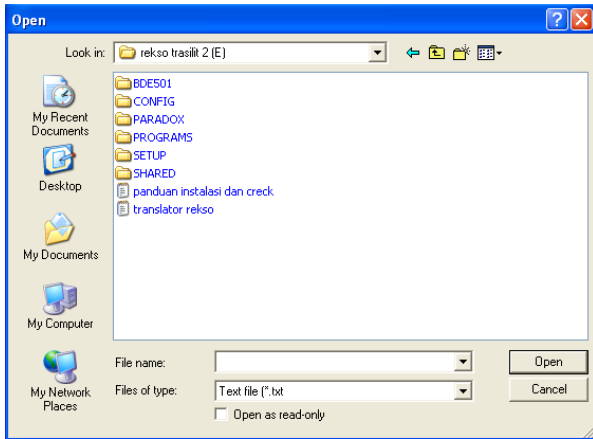

Figure 19. File Form Display

B.   Operational experiments Hardware

Operational testing of a simulation done by trying to use radio communication with the approach tailored to the actual field conditions. The experiments performed include lab experiments and experiments outside the lab. More detail can be seen in Figure 4:10 of the scenario testing.
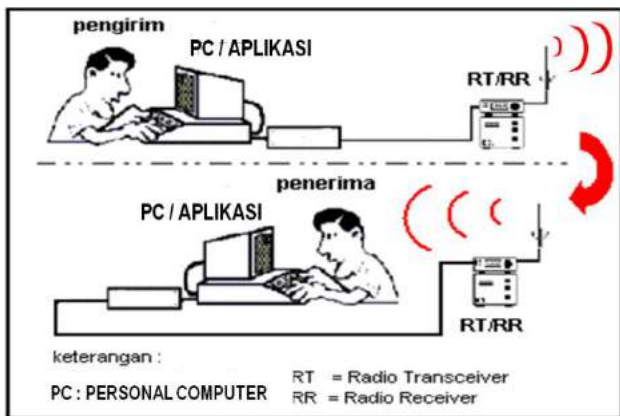

Figure 20. Operational experiments Hardware

From the above scenario testing using radio ICOM HF / VHF / UHF all mode transceiver IC - M700TY as the sender and the IC - M700PRO as a receiver. Here are the results of the testing program has been done:

No	Distance Messaging	Messaging send	Application	Received Posted	Information
	3 Meter (Testing Lab)	Morse code translator application was made to simplify the user's information canda send receive news or information using Morse code	translated	Morse code translator application was made to simplify the user's information canda send receive news or information using Morse code	succeed
	10 Meter (Testing Lab)	Computer Science	translated	Computer Science	succeed
	Outside Lab Testing (50 m)	Faculty of engineering	translated	Faculty of engineering	succeed
	Foreign testing (+ 100 m)	Informatics engineering, engineering faculty University of murawan 2009	Error	Error	Beam interference

Table 4. Results of Operations

Results obtained from the operational testing tools is that the distance delivery affects the frequency of the radio transceiver and receiver. For the distance is influenced by the selection of radio and antenna that is used when trying to test. ICOM Radio HF / VHF / UHF ICOM HF / VHF / UHF all mode transceiver IC - M700TY used in the trials can be used with long distance shipping, but the grasp of the signal by the radio receiver depends on the ability of the antenna, so the effect on the frequency of the Morse signals posted. It can cause a translation error in Morse code translator applications have been made.

V. CONCLUSIONS

Making Application-Based Computer Translator Sandi Morse made through the stages of testing. From the results of designing, testing and trial of the application is obtained conclusions:

1. The results of testing the application with the hardware that is done by testing in the lab and outside the lab to give good results, so as to reduce the boredom experienced by the operator.
2. These applications can improve the accuracy of the information sent and received.
3. Information sent or received can be stored easily using a computerized system.

VI. REFERENCES

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