```
***********************************************************
*                                                         *
*                                                         *
*    <<=============== L Y N C ==================>>        *
*                                                         *
*               Data Communications Program               *
*           :                                             *
*                   Version 3.0                           *
*                                                         *
*               Copyright (C) 1982,83                     *
*                 Midnight Software                       *
*                                                         *
*                ( CP/M Z-80 version )                    *
*                                                         *
***********************************************************
```

LYNC Installation für Tandy Modell 4

```
       DATA input/output port  = EB:
       STATUS / CONTROL  port  = EA:
       RECEIVE  ready bit mask  = 80:
       TRANSMIT ready bit mask  = 40:
```

Kommandotaste habe ich auf @ gelegt, ist am einfachsten zu merken.

```
       Nr   port   bytes
       --   ----   -----
       1.   (not used)
       2.   (not used)
       3.   (not used)
       4.   (not used)
       5.   (not used)
       6.   (not used)
       7.   (not used)
```

Die Installation 49 (Modell I-III) geht nicht für Modell 4, das läuft nicht. Modell 4 muß von Hand wie oben installiert werden.

Dort werden für Mod. I-III initialsiert:
```
       Port Byte
       ---- ----
       E8   00
       EA   ED
```
===

Seite 19 fehlt in meinem Oroginal

Einige Seiten des Handbuchs sind oben
fehlerhaft. Ich habe die einfach etwas
nach unten verschoben. Was dort fehlt,
fehlt auch in meinem Oriiginal-Handbuch.
Auch andere Leute schlampern mal ...

LYNC 3.0

LYNC 3.0 is an upgrade of the popular Lync data communications package. But, in many ways, it is an entirely new product, for it is now both much more flexible and easier to use than ever.

LYNC 3.0 is really three programs in one. Put it into its Lync "mode", and LYNC 3.0 will transfer files between microcomputers running CP/M, MP/M, TURBODOS, MmmOST, CDOS, and/or MDOS operating systems with complete error checking and correction. In its Term "mode", LYNC 3.0 can automatically log on to a timesharing mainframe and upload and download (and save) files. Most exciting of all, anyone using a microcomputer or standard terminal can put a microcomputer running LYNC 3.0 into its Remote "mode" (with optional password protection) and execute any program which that microcomputer can access.

Because of this flexibility, LYNC 3.0 can greatly increase your microcomputer's usefulness. A menu-driven installation program makes it easy to install LYNC 3.0 on a wide variety of microcomputers and modems (including popular auto-dial/auto-answer modems). Its simple commands make it equally easy to make a microcomputer both the central unit in an an office- or company-wide computing system and a functional part of a nation-wide computer network. And the new Remote "mode" allows you to do much of this with standard "dumb" terminals.

Price: LYNC 3.0 is a very good deal at its normal price of $155, but you can buy it for $135 if you order before September 15, 1983. If ordered with the P&T ACP, the price is even less. (See the accompanying order form.) A LYNC 3.0 brochure is available upon request.

LYNC 3.0 Terminal program

Before running LYNC for the first time, it is necessary to perform an installation procedure through an accompanying file called "Patch." By typing "PATCH LYNC" you gain access to a menu driven program that allows you to easily customize the LYNC package for your specific computer. In addition to the initial installation, you may decide to make several "different" versions of the setup, changing options like the resident drive, baud rate, modem type, and duplex. By copying the original LYNC under another name (LYNC-1, for example), and pairing it with a specially configured PATCH, you would not need to change the operating parameters every time you dealt with a different host computer with unique requirements.

Once you have customized your installation in PATCH, LYNC can be invoked without concern for operating parameters by typing "LYNC."

LYNC is divided into three main modes: LYNC, REMOTE, and TERM. The LYNC mode is only used when communicating with another computer also running LYNC. The REMOTE mode is used to allow operation of your computer from a remote location. The most commonly used mode is TERM, which is used to access time-share or other computers not running LYNC. The TERM mode causes your microcomputer to act as a terminal.

TERM is subdivided into Command and Conversation modes. The prompt "@:" indicates that you are in the Command mode. To enter the Conversation mode, press <ENTER>. (Some commands automatically place you in the Conversation mode upon their completion.) To get back to the Command mode, press <ESC>.

The commands available in the TERM mode may be displayed on the screen by issuing the command "HELP," but you must refer to the documentation for help in using the commands properly. The Command library consists of single words, some that require arguments, and some that require external files to have been previously created with the text editor. The format for these files is given in appendices in the documentation. Although the initial creation of these files takes about five minutes, it is time well spent in terms of shorter connect times.

For example, you can issue the command "CALL NM" (where "NM" is a name in your external file) and LYNC will look up the phone number, wake up your modem, and automatically dial your host. Another time-saver is available with the "LOG XX" command, where "XX" is a file name for a file that contains a log-on sequence for a given host.

File sending and saving is accomplished for different types of files (ASCII or binary) by using discrete commands dependent upon the file type and the way in which you want a file transferred. For instance, "SEND" sends a file without line feeds, "FSEND" sends a file in a continuous stream without waiting for a prompt from the host, and "XSEND" converts a file to ASCII as it is being sent out.

By typing the "PRINT ON" command, everything that reaches the display screen can be simultaneously sent to your printer without creating an intermediate disk file. Depending on your printer's capabilities, this may slow down your communication process. Extensive experimentation appears to be the only reliable way to evaluate some commands, especially when you consider that there are usually many ways to achieve the same end result, some being more efficient than others.

The "User's Manual" that accompanies LYNC is logically separated into three sections corresponding to the three main operating modes. Instead of a subject index, an appendix named "Quick Reference Guide" lists (alphabetically) the available commands in each mode, gives a brief description of their function, and then references a page number for a more detailed discussion. With a little luck, the next printing will be set in larger type.

Comparison

After much deliberation, I sill find it difficult to recommend one of these communication packages over the other. Judgment has to be made with your intended application in mind.

In terms of price Micro Link II has the edge: it sells for $99 as compared with LYNC 3.0 which sells for $155. But LYNC offers some features for the extra $56 that may prove it superior, depending upon its intended use. For example, Micro Link II offers a limited selection of baud rates, those being the most popular (300, 1200, 4800, and 9600). If you would like the option of 2400 baud, which we have found to be the optimum rate when using a Model II as an added "user terminal" on our XENIX system, you need LYNC instead. LYNC also allows output to a serial printer from within the program without creating an intermediate disk file; Micro Link II does not.

Micro Link II is available from:
Digital Marketing
2363 Boulevard Circle
Walnut Creek, CA 94595
800/826-2222
Contact: Hal Miller, Sales

LYNC 3.0 is available from:
Pickles & Trout
P.O. Box 1206
Goleta, CA 93116
805/685-4641

TABLE OF CONTENTS

Please begin by MAKING A COPY of the entire LYNC disk and filing the original away for safekeeping. You may make all the copies you wish for use on your own computers.

The three files that you see on your LYNC disk are as follows:

LYNC.COM	The LYNC program itself
PATCH.COM	Used to setup, checkout, and set LYNC options
IO.DRV	Input/Output drivers for various computers

With all three of these files present on a disk, just type -

        PATCH LYNC<cr>

        (the <cr> means to hit the RETURN key)

You will see a menu with the following choices -

        1. Initial Installation of LYNC
        2. Install MODEM driver
        3. Modify Current Installation
        4. Change BAUD RATE
        5. Change TERMINAL Options
        6. Change OTHER Options
        7. Change SYSTEM Options
        8. End

    Enter the number '1' and hit the RETURN key.

You will now see the first group of installation selections. There are actually two types of selections. One type is for installation of LYNC at a specific port in a specific computer. The other type is for custom installation of LYNC in a computer that is not listed in any of the groups.

You should first go through the list to see if your computer is listed. Just hit RETURN to see the next group. If you come to the end and have not found your computer listed, you can go back to the start and choose one of the custom installations.

In either case, the PATCH program will give you directions or ask questions as necessary. Only the 'custom installations' require you to know anything about your computer.

If you want to make some additional changes, you should choose the catagory that you want by number. Here are the types of changes that are available under each of the selection numbers.

4

1. Initial Installation of LYNC

Use this selection for doing initial installations or re-installations of LYNC.

2. Install MODEM driver

This will give you a list of auto-dial type modems that are currently supported by LYNC. If you have none of the ones on this list, pick #1 to let LYNC know that your modem does not do any auto-dial operations.

3. Modify CURRENT Installation

Used for making changes after using #1. This works just like doing a 'custom installation' except that you will be able to see the current data values used to access and initialize your serial port. This is most useful when you have additional ports in your computer that were not original equipment but were added later.

4. Change BAUD rate

If you only need to reset the baud rate.

5. Change TERMINAL options

You will be presented with a series of options. You may leave any of them unchanged by JUST HITTING THE RETURN KEY i. response to a question. The list of options is as follows:

    select FULL or HALF duplex operation in [TERM]
    filter out or convert incoming control characters
    set 'prompt' character for use in SEND feature
    set 'guard time' for use in SEND feature
    set auto log-on timer value
    set auto log-on timer retries
    set XON/XOFF and DELAY for [TERM] mode data transfers

6. Change OTHER options

As in #5, you will be given a list of options. These are as follows:

    set 'power up' mode to [LYNC], [TERM], or [REMOTE]
    set number of disk drives that you want accessible
    set the 'command mode' key character
    set the password needed for remote access to your computer
    set end of line delay (used in remote access mode)

5

7. Change SYSTEM options

This group of options is not normally used.   In case you need
to, you may reset the following:

a

    the character used to backspace on your console
    the clock speed of your computer
    the maskable interrupt condition

NOTE: You may run the PATCH program at any time to make
changes in an already running copy of LYNC.   For example, if
you only want to reset the baud rate, just type 'PATCH LYNC'
and choose #4 on the menu.

You do not need to read thru this section of the manual. Just follow the instructions in the PATCH program. If at some point in using the PATCH program you find that you need more information, look up that particular point in this section. You will note that all of these points are KEYED BY LETTER to the same point in the PATCH program.

[A] If you have any of the computers listed on the screen, just enter the corresponding number and hit the RETURN key. (just hitting RETURN by itself will give you more selections)

If your computer does not appear on this list, you must choose one of the CUSTOM INSTALLATIONS. These are listed according to known types of hardware serial devices. Selecting the proper one for your hardware will pre-set most of the information you need to make it work. Any information that is unknown will be set to 00.

One selection is for general custom installation and has no initial data in it.

[B] The selection you made in [A] cannot be verified. Check to see that your serial port is really connected back to itself.

NOTE: If for some reason you want to continue as if the test had passed, you may enter a ^S here to skip this procedure.

[C] There are four essential questions that must be answered to do a custom installation of LYNC in your computer.

1) What is the address of your serial data port?
2) What is the address of your serial status port?
3) What value is used to mask (select) your receive ready bit?
4) What value is likewise used for your transmit ready bit?

Each of these questions should be answered in HEXIDECIMAL. Numbers 1 and 2 must be in the range of 00 to FF. Numbers 3 and 4 must be selected from the following:

```
----> 01 02 04 08 10 20 40 80 <----
```

Consult your computer hardware manuals to get these numbers.
If they are not in your manuals, contact your local computer
store or computer manufacturer. If some problems persist,
contact us - we keep an updated file of infomation on many
computers.

[D] You may not need to do any initialization of your serial
port. Some computers are initialized with switches inside
(check your hardware manuals to set these), others are
initialized by software automatically when you start up your
machine. Still others have some type of configuration
program that you need to run first to set up baud rates and
other options.

If you need to do some initialization here, select one of the
sequences by number. Then enter the port number followed by
the bytes that should be sent out to that port. Enter the
necessary bytes as TWO DIGIT HEXIDECIMAL numbers separated by
SPACES (no leading zero; no 'H' suffix).

You may set up any, all, or none of these sequences as you
see fit. To remove one entirely, choose by number - then
just hit RETURN when it asks for the bytes.

When the LYNC program runs, these sequences are executed in
order. If you need to send out more than 10 bytes to any one
port, specify the same port number in the next sequence and
put the remainder of the bytes there.

[E] The numbers you have entered for ports, bits, and
intitializations do not appear to work. Hit RETURN to
continue. You will be sent back to try again. If you are
doing a CUSTOM INSTALLATION or MODIFY INSTALATION, you will
be asked to re-answer the questions you were asked before.

Note: You will be able to see the numbers that you have
entered and may leave some of them alone by just hitting a
RETURN in response to a particular question.

[F] You must physically connect your TRANSMIT and RECEIVE lines on your computer before proceeding. Also, some computers have other requirements for enabling the serial port such as 'CTS' (clear to send) and possibly others. Consult your hardware manuals if your serial port just refuses to self check. Also: see appendix on cables and connectors.

Many computers use a DB-25 connector for the serial connection. The transmit and receive lines are usually pins 2 and 3 respectively as shown below. Pin 7 is likewise usually ground.

rear view of female (holes) DB-25 connector.

```
 --------------------------
/ o o o o o o o o o o o o \
/ o 2 3 o o o 7 o o o o o \
 --------------------------
```
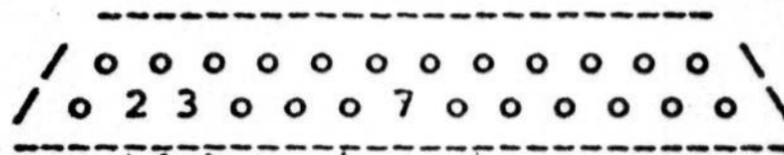
After connecting the transmit and receive line, hit RETURN. Three tests are then made on your serial port.

     1) transmit status
     2) receive status
     3) receive data

When you get an 'OK' for each of these, your serial port is already running and the rest is easy.

Should any of these tests fail, you will be directed to either try some other numbers or choose a different selection from the main menu (depending on whether you got to this point via menu selection or custom installation).

The following may also prove helpful:

If the first test fails, something is entirely wrong. Your data port does not appear to be where you thought it was, or it is broken, or it needs some of the control lines on your db-25 connector jumpered (see appendix on cables and connectors)

If the second test fails, you may not have a good connection in the jumper you installed (you did install the jumper?), or you are on a different port than the one you have jumpered, or you have the wrong bit mask for receive ready.

If the third test fails, you may be conigured for only 7 data bits, or your send and receive baud rates may be different, or something else in your computer is accessing the same port concurrently.

[G] This number is used to control various software timing loops in the LYNC program. You need only answer to the NEAREST WHOLE NUMBER. This number is not very critical.

NOTE: You may also 'fudge' this number to make some things that LYNC does go faster or slower. Enter a number LOWER than your actual clock speed to make things go FASTER.

[H] Only some older or 'hacker' model computers use anything other than 08. Just hit RETURN to leave this as-is.

[I] Some computers run a 'real time clock' interrupt which may result in the loss of data INCOMING on your serial port. This is because your machine is off doing something else when it should be looking for data coming in. The result is that your BAUD RATE (data transfer rate in bits per second) may be severely limited. Exceptions to this are computers that use a multi-byte buffer IC (like the Z80-SIO in a TRS80-II) that pile up incoming data bytes while the processor is 'out of town' dealing with an interrupt. If not inexorably confused at this point, you should enter:

0 - To leave things be and hope for the best.

1 - To disable interrupts and hope that your keyboard doesn't "freeze-up" or some other essential function quit on you.

2 - If your computer will run with interrupts turned off but looses track of time (real time clock).

Note: If you select 1 or 2, you will then see:

Interrupts disabled -

If some things stop working in your computer at this point, you may have to restart from scratch.

[J] For your information and edification, this program checks your computer for interrupts. Only interrupts that run on a continuous, clocked basis are detected - not ones that occur only when a key is struck or the disk is accessed.

[K] This is the length of time (in 10ths of a second) that LYNC will wait before assuming that a prompt string has been sent by the other computer. If none of the prompts that you have specified in your log-on file are matched, it again waits for the same length of time and tries again for a match. This process is done several times in order to find a match. You may also specify the number of times it tries by changing the retry number. The total time that it waits is always:

$$TOTAL\ TIME = (\ TIMER/10\ )\ x\ RETRIES$$

If nothing matches after this much time, the last response that it sent out will be re-transmitted.

[L] FULL DUPLEX means that all characters typed on your console will be sent out your serial port. In this mode, it is the responsibility of whatever is on the other end to ECHO BACK each of the characters that you type.

HALF DUPLEX means that the computer on the other end does NOT echo back your characters. In this mode, LYNC will put the characters that you type on your console screen in addition to sending them out.

[N] At you convenience, LYNC will 'come up' in any of three modes. IF you choose to come up in the REMOTE mode, be advised that your keyboard will become INOPERATIVE — console control has been transferred to the serial port.

[O] One control key (of your choice) will be used by you to access the COMMAND MODE. We are currently setting this as ESCAPE (also known as ^[). If you need the ESCAPE key for other purposes, you must define a new control key for this function. Hit the desired key (don't forget to hold down the control key if necessary) and then hit RETURN.

[P] When control characters are RECEIVED in the terminal mode, you have three options of what to do with them. If annoying things are happening to your video screen, or you get tired of hearing bells ring, you may convert incoming control characters to the printable representations (^A, ^B, etc.) or discard them entirely as they come in.

[Q] Some of the data transfer operations that operate in terminal mode use XON/XOFF protocol. The standard values for XON and XOFF have been put in as defaults. You may change them if necessary.

computer has stopped sending can be reset here. If the default value is not optimal for your situaltion, re-run the PATCH program and reset this value. It is one of the TERMINAL options.

[R] You may designate which disk drives AT YOUR END are accessible when in LYNC mode. This is to prevent the operator at the other end from trying to 'log on' to non-existent disk drives which will 'hang up' your system.

You may also select "00" for this option. This will prevent access to ANY drive other than the ONE WHICH YOU ARE CURRENTLY LOGGED ON TO.

[U] When sending or 'uploading' text files to a timeshare or bulletin board computer (using the SEND function), you may specify just what character is used by the remote computer to 'prompt' you for the next line of input. You may also specify 'linefeed' as a general type of prompt character - most all remote access computers send a linefeed at the end of each line they receive. For the fastest possible uploading, you should specify the exact character used as a prompt. (NOTE: If the prompt you get is followed by a space, specify a 'space' character for the prompt.)

[V] This only applies to computers that have serial devices that are 'memory mapped' rather than 'port mapped'. It is assumed that all the necessary 'ports' have the same 'page address'. For example, if your data port is at location 3040H and your status port is at 3041H, you should enter '30' for your page address, '40' for your data port, and '41' for your status port.

The transmit and receive ready mask bytes work the same as in port-mapped computers. So do your initialization bytes (if any).

[W] In the REMOTE ACCESS mode, your computer is being run from a remote location via your serial port. At higher data rates (above 300 baud or so), some terminals (or computers acting as terminals) cannot handle the incoming data fast enough. To accommodate them, you can specify a DELAY to be used at the end of each line of data sent out by your computer to the remote terminal. This delay is in arbitrary units that are about .01 second or so each. Experimentation is the best way to set this value. Our default value of 10 is a good enough place to start. If your remote terminal loses charactars at the start of each line, INCREASE this number.

[X] This question appears only on machines which can have their baud rates set via software. Enter one letter to choose the baud rate. NOTE: You may choose ONLY from the letters listed on the bottom line. These are the only ones that are available on your computer.

[Y] The baud rate on your computer cannot be set by LYNC for one of two reasons:

1. Hardware jumpers or switches set your baud rate.

2. Information is not available to us as to how your particular computer sets baud rates via software.

[Z] There is no password initially assigned for granting REMOTE ACCESS. If you type in any word or phrase here, that will become your new password. If you just hit RETURN, the current password (or lack of one) will be maintained. To remove the password, enter one space and then hit return.

NOTE: Blank spaces in passwords are ignored, as are upper and lower case. Your password may be up to 80 characters in length.

ALSO: There is absolutely no way to determine what the existing password is at any time other than when it is entered.

< OPERATING INSTRUCTIONS >

This program has THREE major modes of operation - LYNC, TERM, and REMOTE. Each of these modes has its own features. Some features (like listing the disk directory) are available in more than one mode. The mode that you are going to be using should be set up as a default (using the patch program), so that you will not need to switch modes to get to the one you want each time you run LYNC. Here is a summary of what each mode is for:

[LYNC]   You should use this mode only for communication between two computers that are both running LYNC. When in this mode, anything that is typed on either console will appear on both consoles. This allows for typeing messages to the operator on the other end.

The main features of LYNC mode are -

1. Send files from you computer to the one at the other end with full error correction.

2. Fetch files from the other computer.

3. List the directory of your disk or that on the other computer.

4. Change disk drives at your computer or at the other computer.

[TERM]   Use this mode when you need to communicate with a bulletin board system or any type of dial-up timesharing system. The primary features of this mode are as follows:

1. Automatic log-on

2. Sending text files

3. Receiving text or other types of files and storing them on disk.

4. General use of your computer as a terminal.

[REMOTE]   This is a special mode which allows your computer to be operated from a remote location. Outside access to this mode is under password protection (optional).

```
*** *   *   * *   *  ***  ***
*   *   *   * *   * *  *    *
*   *   *  * *  **  * *     *
*   *   * *   * * * *      *
*   *   *   *  * ** *  *    *
*** ***** *   *   *   ***  ***
```

To operate in this mode, both computers must be running the LYNC program and both must be in [LYNC] mode. After the serial connection is made (via direct connection or modems), either operator may confirm [LYNC] mode by typing CONTROL-C (hold down CTRL key and then hit 'C').

This will produce the result –

        Linking
        .... OK
        [LYNC]

at both computers. This is the message communication mode. Whatever is typed by either operator will show up on both consoles. Both computers will stay in this mode until one or the other operators activates some command.

The options available in this mode are listed below. You must first hit your COMMAND MODE key and LYNC will respond with the command mode prompt.

        -----------> @: <---- (it looks like this)

Enter the command for the operation you want (followed by any necessary filenames) and then hit RETURN.

COMMAND   FUNCTION

SEND   Send files to the other computer

                        Example –

                        @: SEND GAME.BAS *.LST ABCDE.COM

                        You may enter the full name of any file on your
                        disk. Several may be entered separatated by
                        spaces. All CP/M wildcard specifications can be
                        used.

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You will then see -

Filename		Bytes	Status
GAME	BAS	3940	Complete
BIG	LST	23992	Complete
SMALL	LST	128	Complete
ABCDE	COM	17443	Complete

```
<DONE>
Linking
....... OK
[LYNC]
```

As each file is sent, its name is displayed and the number of bytes sent is displayed and updated as each block of data is sent. The current status of the file transfer will appear under the status heading. These conditions are as follows:

Normal	(all is going well)
Retry	(a duplicate block is being sent)
Checksum	(a checksum error has occurred)
Timeout	(a timeout error has occurred)
Duplicate	(a duplicate record has been received)
Complete	(all of the file has been transferred)

. . . .

FETCH   Fetch files from the other computer
                Example -

@: FETCH GAME.BAS SHOPPING.LST WHATSUP.DOC

This mode works exactly like SEND, but the files will be transferred FROM the remote computer TO your computer.

. . . .

DIR   List disk directory on console
          Example -

@: DIR

This mode displays the files on your disk in a form similar to that in CP/M (the display includes the drive specifier).

. . . .

RDIR   List other computer's directory on console.
           Example -

@: RDIR

. . . .

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DRIVE   Relog onto another disk drive in your computer
        Example -

        @: DRIVE B

. . . .

RDRIVE   Relog the computer at the other end onto a
        different drive
        Example -

        @: RDRIVE C

. . . .

CALL   If you have installed a modem driver when setting
        up LYNC, you have access to the auto-dial
        functions (CALL and DIAL). The CALL function also
        requires that you create a disk file with names and
        phone numbers in it. (See appendix on creating
        an auto-dial phone file.)

        Example -

        @: CALL MIDNIGHT SOFTWARE ok dialing 1-805-555-
        1212 this is a comment

        If the name you entered matches one of the names in
        the disk file, the proper commands are given to
        your modem to dial the number. Also the number
        itself and any comments that you included in the
        file are printed on your console.

. . . .

LIST   This command works exactly like the CALL command
        except that nothing is actually sent to the modem.
        It is used to simply list an individual phone
        number - which could be of use if your modem does
        not do auto-dial. It works like this -

        @: LIST MIDNIGHT SOFTWARE ok 1-805-555-1212 this
        is a comment

        Note that you may have comments in your phone
        listing file which will be printed on your console.

        You may also view the entire phone dialing file by
        just typeing -

        @: LIST

. . . .

DIAL   used to call a number that is not in your phone
number file. To use it just type -

@: DIAL 1-805-555-1212

. . . .

/   This command lets you 'que up' a line before
sending it. Its main use would be in sending
commands to an intelligent modem. You may find
other uses for this command.
Example -

@: / ATD 555-1212

. . . .

REMOTE   Puts you computer in a mode where the computer or
terminal at the other end will be able to run
yours. Once you activate this mode, your keyboard
will become inactive. You console screen will
remain active however, so you will be able to
monitor what is going on.
Example -

@: REMOTE

[REMOTE]

A>

. . . .

TERM   Puts you in the TERMINAL MODE. Once there, you have
a somewhat different set of commands available.
Example -

@: TERM

[TERM]

. . . .

EXIT   This gets you out of the LYNC program and back to
the operating system.
Example -

@: EXIT

A>

. . . .

control-C   Hold down the CONTROL key while hitting 'C'. This
will abort any data transfer in progress or just
re-confirm [LYNC] mode.
Example -

```
***  *****  *****  ****   *      *    ***
*      *    *      *      *      **    **     *
*      *    ***    ****    *    *  *   *
*      *    *      *       *    *    *  *
***    *    *****  *       *    *       *  ***
```

This is the mode used to access timeshare, or other computers
which are not running LYNC. In essence, your computer is made to
act as a terminal. That is, whatever you type on your keyboard
is sent out (including control characters) and what ever comes in
(via your serial port) is sent to your console (video screen or
termial).

The options available in this mode are listed below. In order
to use them, you must first hit your COMMAND MODE key, and LYNC
will respond with the command mode prompt.

         `------,---> @: <---- (it looks like this)

Enter the command for the operation you want (followed by any
necessary filenames) and then hit RETURN.

COMMAND   FUNCTION

SAVE   Buffer all incoming data in memory in addition to
                     displaying it on the console. The data will be
                     written to the disk each time you hit the COMMAND
                     MODE key. You may then continue storing data and
                     again write out to the file. You should use the
                     CLOSE when you have received all of the data.

                     Example -

                     @: SAVE MARKET.DAT
                     {buffer ready}

                          (all of the incomming text appears here)

                          (now you hit you command mode key)

                     {Writing Data to Disk}
                     {buffer ready}
```

```
@:              (you just hit RETURN here)
[TERM]

(more data comes in here - you stop the  incoming
data and again hit the command mode key )

{Writing Data to Disk}
{buffer Ready}
```

CLOSE
```
@: CLOSE
{Close file}
[TERM]
```

. . . .

ASAVE

Works the same as SAVE, but data is automatically written out to the disk when a large pause is sensed in the incoming data.

If however, the data coming in gets to within 1k (1024) bytes of filling you memory space, LYNC will issue an XOFF character to tell the other computer to stop sending. If data stops coming in for a specified time (see point [Q] in installation instructions) it is assumed that the other computer is responding to the XOFF character. The data stored in memory is then written to the disk. LYNC will then issue an XON character to tell the other computer to resume sending. This process will be repeated as necessary until all the data is in.

Should the remote computer fail to respond to the XOFF character and continue to send data, LYNC will continue to store data in the remaining memory space. If this fills up entirely, you will see:

```
{buffer full}
{Close file}
```

and LYNC will automatically write out all the data it has in memory to the disk.

Example -

```
@: ASAVE OTHER.TXT
{buffer ready}
[TERM]
```

(incoming text is saved in memory until no data
is sensed for a specified time - then you will
see)

.{file closed}
{buffer off}
[TERM]

· ·

QSAVE   Works just like ASAVE except that the data is not
sent to your console.   This feature is used when
your console cannot handle data at the speed that
it is coming in, or because the data is binary
in nature (has all 8 data bits used) and cannot
be viewed on your console.

Exa le -

@: *Q*SAVE PROG.COM
{buffer ready}

(a pause occurs in the incoming data when all of
it has arrived - then LYNC will show)

{buffer off}
{file closed}
[TERM]

· ·

SEND   This is the normal way of sending text data to
another computer. The data is sent out a line at
a time.   After sending each line LYNC waits for
the other end to issue a prompt character. If no
prompt character arrives, LYNC will wait about 7
seconds after the last data stops coming back
from the remote computer and then sends the next
line of text.

For best results, you should set up LYNC to look
for the prompt character used by the remote
computer.

Example -

@: SEND MESSAGE.LST

(you will see the file as it is being sent out)

[TERM]

· ·

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FSEND

This works just like SEND, but LYNC does not wait for any type of response from the remote computer. Instead, all the data is just sent out in one continuous data stream.

This will work with some remote access type computers if you are reaching them through a networking system. An intermediate networking system will handle continuous data from your end and still not overrun the remote computer.

This mode also responds to XON/XOFF protocol. The remote computer can start and stop the data using the specified XON and XOFF characters.

You may send out any type of file in this mode — whether the other computer will be able to receive it depends on the other computer.

Example —

@: FSEND GAME.BAS
[TERM]

. . . .

XSEND

This works like FSEND except that it converts the data from your disk file into a standard ascii hexidecimal checksum file as it is being sent out.

The XON/XOFF protocol is active and works the same as in FSEND.

This mode is used to send .COM type files to computers that can only handle ascii files. It is useful in sending a copy of the LYNC program itself to some other computer which is running the PIP utility. The program you send this way can be converted back to its original form in the remote computer by using the LOAD program.

. . . .

LOG

This is the automatic log-on feature. In order to use it, you must first create a log-on file on your disk (see appendix on creating this file). You then invoke the procedure by typeing:

```
@: LOG COMPSERV
enter your terminal identifier A
please log in: CISO2
user number: 12345,678
Password:DINGY/LAUNDRY
[TERM]
```

The transaction that goes on between LYNC and the
other computer will be visible on your console.
Whenever a prompt string that matches one of the
entries in the file is received, the appropriate
response is sent out.

During this time, your keyboard remains active.
If some unforseen prompt string arrives during
the auto-logon, you may type in a response
directly. The automatic log-on will then
continue until the entire procedure is complete.

. . . .

PRINT ON   This will send all incoming data to your standard
                    list device (printer) as well as displaying it on
                    your console. Since printers are usually slower
                    than crt console devices, you may not be able to
                    receive data at as high a baud rate. Some
                    printers are 'double buffered' and can handle
                    almost any reasonable baud rate. You will just
                    have to try it to see how it works on your
                    system.

PRINT OFF   This disengages your printer
. . . .

LYNC   (Sends you to [LYNC] mode)
. . . .

DIR, LIST, DIAL, CALL, /, and EXIT

                    (see instructions under LYNC mode)

. . . .

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```

Here are some additional points of interest to the [TERM] mode.

1) You may have LYNC come directly to the [TERM] mode by selecting this as your power-up-mode during INSTALLATION using PATCH.

2) You may also select HALF DUPLEX operation. This means that LYNC will self-echo all characters you type while in the [TERM] mode.

3) Incomming control characters may be converted to a printable form (^A ^B ^C etc.) or filtered out of the data completely by selecting one of these options durring installation. Carrige returns and linefeeds are not altered in either case.

4) All download data that comes in is sent to the disk "as-is" no matter what you selected in (3) above.

5) The codes used and recognized for XON and XOFF can be set to any single byte values during installation.

6) You may re-install a running copy of LYNC to change any of these options. The PATCH program will display the current values for all options.

```
*** ****  *****  *   *   ***  *****  *****  ***
&   *   *. *    **  **  *   *    *      *       *
&   ****  ***   * * *   *   *    *      ****    *
&   *   * * *   *   *   *   *.   *      *       *
***  *   *  *****  *   *    ***     *      *****  ***
```

This is the mode that allows your computer to be operated from a
remote location.   Once this mode is activated, all operation of
your computer is controlled by whatever is connected to your
serial port.   Your console screen will still be active, but your
keyboard will be totally inoperative.

There are three ways to get your computer into the remote access
mode.

1) When installing LYNC using the PATCH program, select REMOTE as
   the mode to 'power up' in. (See installation instructions.)

2) While in the [LYNC] mode, hit your command key and then type
   the word 'REMOTE'.   This will put YOUR computer into the
   remote mode.

3) Run LYNC in your computer and connect it to another computer
   also runing LYNC.   Start with both computers in the [LYNC]
   mode.   Then, at your computer, hit the command key and type
   'TERM' to get into the terminal mode.   Then hit a control-X.
   The other computer will respond with —

       Password:

You must enter the password that was assigned when LYNC was
installed using the PATCH program.   If no password was
assigned, you should just hit a RETURN here. (See installation
instructions if you want to assign a password for remote
access)

If the password you entered is correct, you will then see —

       Remote Access GRANTED.

       [REMOTE]

       A>

If the password is not correct, you will see —

And you will be left in the [LYNC] mode (at the other end, you are still in the [TERM] mode at your end) You can try again by hitting another control-X and trying another password.

You can run ALMOST any program remotely. Some programs that need all of the memory in the computer may not run because LYNC leaves a remote access module in memory to communicate with the remote terminal and this used up some memory.

You can get back into LYNC (to transfer files and such) by running the LYNC program in the computer that is being run remotely. Once you have the other computer running LYNC, hit your command key and type 'LYNC' to get back in the [LYNC] mode at your end.

You may go from [LYNC] to [REMOTE] and back as many times as you want.

It is not necessary to have the LYNC program acting as a terminal to remotely run your computer. You may, of course, actually connect a TERMINAL to the serial lines either directly or through a modem. Hitting control-X at the terminal will activate the remote access option of LYNC in your computer. (Your computer must be in the [LYNC] mode to begin with)

NOTE: When you are at the computer that is being 'taken over' by other computer, you will not see the password being typed in, but you will see everything else that is going on.

< In Case Of Difficulty >

Here is a list of some common problems and possible remedies.

1) Program runs in [LYNC] mode and [TERM] mode, but dies when a file is sent or received.

   (you have a bad copy of the program, go back to your original disk and get another copy)

2) Both computers self check during installation, but a line of wierd characters appears on the console when they go to [LYNC] with each other.

   (the BAUD RATES of both computers do not match - the serial ports are running at different speeds)

3) During installation, the self test passes on 'transmit status' and 'recieve status' but fails on 'recieve data'.

   (you are set up to send only 7 data bits instead of 8 - check hardware and/or software initializations)

4) In [LYNC] mode, files can be sent only in one direction and characters are missing when viewing a remote directory.

   (the computer that does not like to receive files may be running INTERRUPTS. This causes incoming data to be lost, resulting in checksum and timeout errors. You may try disabling interrupts be rerunning the PATCH program. Or you may try a lower baud rate to give the receiving computer more time to catch each data byte.)

Getting LYNC into a computer with a non-available disk format.

This procedure will only work if PIP can connect to a serial port in the 'target' computer. If the target computer uses a terminal, disconnect the terminal and connect your other computer (running LYNC in the [TERM] mode) in its place.

The alternative is to type "STAT CON:=TTY:" on the target computer to set the console re-assigned to the serial port and connect your other computer as a terminal as above.

If you can get to a point where you are RUNNING the target computer from your other computer using LYNC in the [TERM] mode, you can easily transfer LYNC over as follows:

```
[TERM]
A>pip<cr>
*lync.hex=con:<cr>
<esc>
@: xsend lync.com
[TERM]
*patch.hex=con:<cr>
<esc>
@: xsend patch.com
[TERM]
*io.hex=con:<cr>
<esc>
@: xsend io.drv
[TERM]
*<cr>
A>load lync<cr>

  . . . . .
A>load patch<cr>

  . . . . .
A>load io<cr>

  . . . . .
A>ren io.drv=io.com
```

(You now have LYNC.COM, PATCH.COM and IO.DRV on the other compute

----

Creating an auto log-on file

In order to make use of the auto log-on facility in LYNC, you must first create one or more log-on files on your disk. This file should be an ordinary text file (one that will list out on your console with the CP/M 'type' command). If you will be using a word processor to create the file, specify it as a 'non document' or 'program' type of file when editing.

Here is an example of a log-on file -

```
\
enter your terminal identifier\A\
Please log on: \CIS02
user ID: \12345,678
Password: \DINGY/LAUNDRY
$
```

The first character in the file (on a line by itself) is the delimiter you will be using. You may specify any printable character as the delimiter to use in separating the prompt strings (left side of entry) from the response strings (right side of entry). If the response string is not to be followed by a RETURN then put a second delimiter at the end of the line.

The log-on procedure will skip around in your list if necessary to match the incoming prompt strings. Also, you may enter additional entries that only sometimes occur - as when the remote computer asks you to confirm a response.

The log-on procedur will end after the last response string in the file has been sent. If there is some chance that the last response may have to be re-sent, then put in a dummy entry after it in the file.

The exact order of events in matching an incoming prompt string is as follows:

1. Try match on next prompt string in sequence
2. Try match on last prompt matched
3. Search forward from next prompt to end of file
4. Search backward from last prompt to begining of file
5. Wait and return to #1
6. After specified number of retries - resend the current response.
7. Reset retry count and go to #1

During the auto log-on, your keyboard will remain active. You may enter responses by hand at any time - the log-on procedure will continue until complete. You may also abort the auto log-on by type a contol-C.

APPENDIX C

Creating an auto-dial phone file

In order to use the LIST and CALL commands in LYNC, you must create a file on your disk containing names and phone numbers in a specific format. As in creating the auto log-on files, this file should be an ordinary text file. This file must be named:

PHONE.LST

An example of what to put into this file is as follows:

```
info:                       411        directory information
midnight software:  1-805-555-1212     lync information
mr. fox:                555-1234       San Diego Zoo
```

You must observe the following rules in putting entries into this file:

1. The name must start at the begining of the line and be terminated by a colon.
2. The phone number must have no imbedded spaces.
3. A comment may run to the end of the line.

There is no limit as to the number of entries in this file. LYNC does a fairly fast search when looking for a name but the exact speed is unknown. If your file begins to resemble the Los Angeles phone book, better put the most used names near the beginning.

Cables, Connectors, and the RS-232 standard

That connector on the back of your computer, the one with the 25 pins or holes, is referred to as an 'RS-232' connector. You will also see it referred to as a 'DB-25'.

The 'DB-25' refers to the actual, physical, connector with the 25 pins or holes. 'RS-232' refers to the SIGNALS that are supposed to be present at each of the pins on the connector.

The pin numbers are usually stamped on the connector but they are so tiny that you may not be able to read them. The diagram below should help you to locate the pins you need. Note:the REAR side of the connector is the one you would solder wires or crimp a cable to. The FRONT side is the one that plugs into the mating connector.

The FEMALE connector is the one with the holes.
The MALE connector is the one with the pins.

```
****************************************************************
*                                                              *
*       This is a REAR VIEW of a MALE DB-25 connector          *
*                          - or -                              *
*      a FRONT VIEW of a FEMALE DB-25 connector.               *
*                                                              *
*       ------------------------------------------------       *
*    /  14 15 16 17 18 19 20 21 22 23 24 25  \                 *
*   /  1  2  3  4  5  6  7  8  9 10 11 12 13  \                *
*       ------------------------------------------------       *
*                                                              *
****************************************************************
```
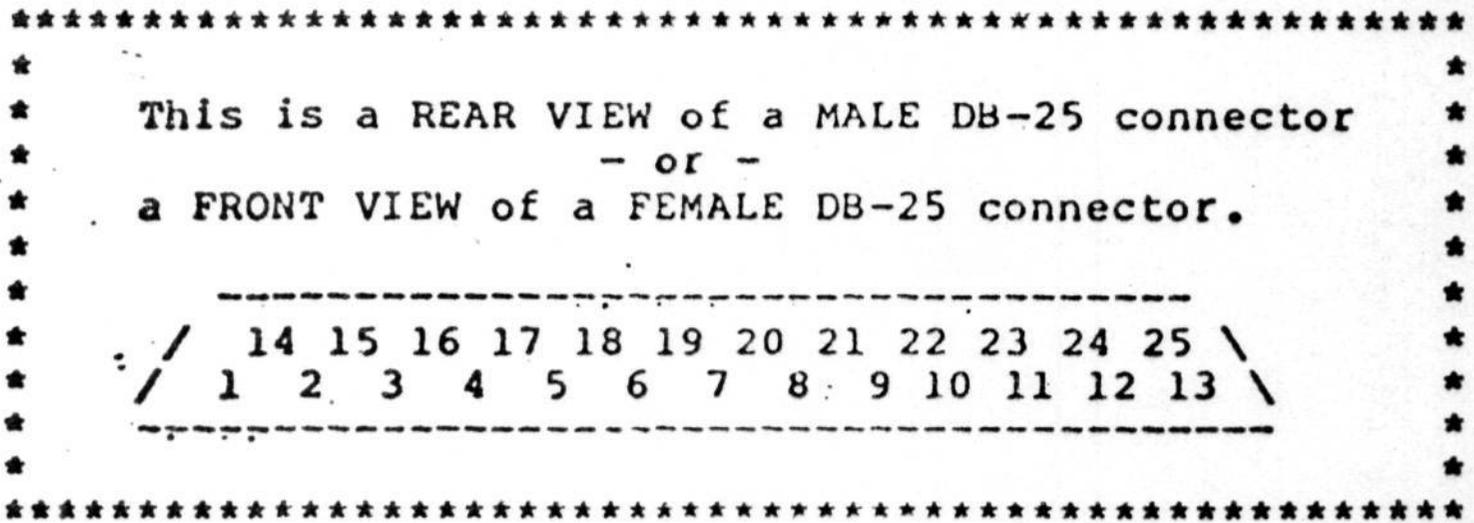
Now that we know what the DB-25 is all about, we can explain what the RS-232 is all about.

RS-232 signals are defined as follows:

```
**********************************
*                                *
*   0 or SPACE is   +12 volts    *
*   1 or MARK  is   -12 volts    *
*                                *
**********************************
```

There are two (2) sets of RS-232 signals. One set is for TERMINALS, the other set is for MODEMS. Some of the signals exist on both terminals and modems, but only some of these signals are on the same pins. These are summerized as follows:

RS-232 for TERMINALS:

PIN	ABBR.	DIR.	FUNTION
1			CASE (SAFETY) GROUND
2	TxD	OUT	TRANSMIT DATA
3	RxD	IN	RECEIVE DATA
4	RTS	OUT	REQUEST TO SEND
5	CTS	IN	CLEAR TO SEND
6	DSR	IN	DATA SET READY
7	GRND		SIGNAL GROUND
8	CDET	IN	CARRIER DETECT
9	+12	OUT	
10	-12	OUT	
20	DTR	OUT	DATA TERMINAL READY

RS-232 for MODEMS:

PIN	ABBR.	DIR.	FUNTION
1			CASE (SAFETY) GROUND
2	RxD	IN	RECEIVE DATA
3	TxD.	OUT	TRANSMIT DATA
4	DSR	IN	DATA SET READY
5	DTR	OUT	DATA TERMINAL READY
6	RTS	OUT	REQUEST TO SEND
7	GND		SIGNAL GROUND
8	CDET	OUT	CARRIER DETECT
9	+12	OUT	
10	-12	OUT	
20	CTS	IN	CLEAR TO SEND

You will notice that we have yet to mention the RS-232 standard for connectors on COMPUTERS. There isn't one. The standards were meant to interface modems with terminals, but not with computers. (we wonder what they were doing with their modems and terminals if not connecting them to computers)

*** Therefore ***

SOME COMPUTERS ARE CONFIGURED AS MODEMS AND SOME COMPUTERS ARE CONFIGURED AS TERMINALS AND SOME COMPUTERS CAN BE REWIRED INSIDE TO BE CONFIGURED AS EITHER.

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To determine which way your computer is configured, use a volt meter to test the voltage at pins 2 and 3 (relative to pin 7 or ground). The one that reads minus 12 volts (give or take a few volts) is the TRANSMIT line. The one that reads 0 volts, or so, is the RECEIVE line.

In most cases the only ones you will need to connect are -

        -------> TRANSMIT DATA (TxD)
        -------> RECEIVE   DATA (RxD)
        -------> SIGNAL GROUND (GND)

The rest of the signals are simpley a nuisance. Most of the time, it is best to leave them alone. This leaves us with only two basic ways to make cables to connect computers to modems or computers to computers. These are -

        1) the NORMAL cable
        2) the REVERSE (or null-modem) cable

The connections for each of these are as follows (A and B refer to the DB-25 connectors at each end of the cable).

NORMAL   REVERSE

A   GOES TO   B   A   GOES TO   B
--------------------------   --------------------------
2 <------------------> 2   2 <------------------> 3
3 <------------------> 3   3 <------------------> 2
7 <------------------> 7   7 <------------------> 7

Unfortunately, some computers require activation of some of the other signals or they will refuse to transmit data. The best way to satisfy this requirement is to add jumpers AT THE END OF THE CABLE THAT CONNECTS TO THE COMPUTER. These signals may also be activated by having a cable that connects them with the proper pins at the OTHER end, but this is risky - the other end may or may not activate them. We recommend the following:

Use a 3 wire cable of either the NORMAL or REVERSE type.

                        - and -

If your computer is configured as a TERMINAL, add jumpers between pins 5,6,8, and 12 AT THE COMPUTER END OF THE CABLE.
                        - or -
If your computer is configured as a MODEM, add jumpers between pins 4,12, and 20 AT THE COMPUTER END OF THE CABLE.