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Introduction to Communications

RealTime Communications provides the link between your Time Clock (Data Collection Device) and the RealTime database program.

The Communications link can be made to your Time Clock in the following ways:

- Using your existing Ethernet LAN (Local Area Network).
- Over a telephone line connection to your computer modem.
- By a Serial cable (RS232) connection directly between your computer and the Time Clock.
- Through a Serial Network (RS485) connected to your computer using an adapter.

If you’re using the RS232 serial or telephone/modem connection, you may also choose between initiating the data transfer at the Data Clock, at the PC, or both. If you are using the Serial Network option, data is updated continuously using a polling process at the PC. The Ethernet options depend on the data collection device and other factors. Careful evaluation of your data collection requirements and the communications options available to you will assist in selecting the method or methods that will work best for you.

The communications process can be fully automated with Data Clock Communications. With the built-in timers and schedules, you can simply load the program and let it do the work. If you want more control by getting one or more downloads on demand, that option is available also.

In addition to providing the communications link between the Time Clock and the database, RealTime Communications also provides a log of all the activities. This log can be used to verify data transmissions and diagnose potential problems.

To insure that you do not lose data during data transmission, the Data Clock Communications program employs a packet error check on each transaction from the Data Clock and provides a double backup and audit trail of the data that has been transferred. Data from the Time Clock is not removed until the transfer has been completed successfully.
**Time Clock Communications Options**

**Ethernet Communications**

Ethernet connectivity is available for our Time Clock terminals. Some Terminal times support Ethernet directly and others will require the use of an Ethernet converter. When Ethernet is directly supported, the IP address of the terminal will be used for the connection. When a converter is used, RealTime Communications will treat the remote terminal as a Serial or Serial Network terminal.

**Serial Communications (RS232)**

The direct serial connection is a very reliable method of data transmission. It consists of a cable that is run between the computer and the Time Clock. This method can be used when the clock is in close proximity to the PC. It is recommended that serial cable should not exceed 200 feet.

Serial communications can be used to poll clocks from the PC or the PC can act as a host for automatic uploads from the clock. If you wish to check the data in the clock frequently, then the polling method is recommended.

*Note: If you are using a direct serial connection to a single terminal, you may choose to collect your transaction data from within RealTime directly. If so, refer to the following section, Serial Communications within RealTime, for instructions.*

**Multiple Clock Considerations (Direct Serial)**

Practically speaking, you can only connect one Time Clock to the PC without making alterations to the system. If the clocks originate the communication process, you can add more clocks if you add a serial switching device to the PC. If the Time Clock originates the communication process, then this can be an automated switch. Any serial switch that is used must be a non-buffered device. Another way to handle multiple serial clocks is to have each one attached to a separate PC on a network, however this may prove awkward for good data management. Consider a Serial Network connection if you wish to physically connect multiple clocks.

**Modem Communications (Telephone)**

One very popular method for gathering data with RealTime is using the Data Clock connected by a telephone line. The advantages to using the phone line to carry data are enormous. You are not limited by distance, you do not have to install very much wire and a phone system can often provide a very inexpensive network for many clocks. Data Clock Communications may also be used in conjunction with most PBX and key service phone systems that provide analog connections. Instead of dialing up through the phone company central office, data is transferred internally within the company.

The disadvantage to using the phone line is that there can be problems with noisy or poor connections. Some phone company lines have excessive noise at the connection speed that the terminals use (1200 baud). This means that manual intervention may be necessary to receive your data.

**Serial Network Communications (RS485)**

Serial Network communications provides a real-time connection to the PC. You may have up to thirty-one (31) Data Clocks on one line. The data is continuously sent to the PC as long as there is not a break in the line. If the data line is broken, data is stored in the clock until the line is re-connected.

The Serial Network can be up to a maximum of 4000 feet long with each clock connected in parallel. This is the method of choice for large installations needing many clocks.
Polling vs. Host Operations (Serial and Modem only)

You may choose to initiate the communication from your computer (Polling mode) or have the time clock initiate an upload to the waiting computer (Host mode), depending on the way you run your operation.

Choosing to Poll your time clock(s) leaves you with two options. You can set up an automated daily schedule to poll each clock or you can simply select a group of clocks you wish to poll and then execute the sequence on demand whenever you need the information.

For modem connected terminals, the clock may have to be connected to a dedicated telephone line. The clock, when in polling mode, will answer the phone on the first ring, every time. For that reason it cannot share a line with a computer, fax or person if an incoming call will ever need to be answered by the computer, fax or person. Because of the extra expense involved with setting up dedicated lines, many users choose to use the host mode for data transfer and set up the clock to initiate the call. In this scenario the clock can share a line with another telephone, fax device, computer or even a person. The disadvantage to host mode is that uploads from the clock are limited to one automated transmission per day. However, the user can manually initiate a transmission as often as desired.

Combining Polling and Host Communications

Most installations will find that Host mode is a sufficient, economical and simple method to transfer data. Fortunately, RealTime Communications supports both methods of communications simultaneously. If you click the Auto button, Outbound (Polling) communications will occur as scheduled. Additionally, between outbound schedules, inbound (Host) communications can be received from the Time Clock.

Serial Communications within RealTime

You may use the serial polling tool built into RealTime if all three of the following are true:

1) Your time clock model is a Verifone terminal, model ZON 53x or TRANZ 33x
2) Your communication method is direct Serial (RS232)
3) You only require polling one time clock (or you are using a method for switching between time clocks)

This method of gathering data is very simple.

You can cause this polling window to be displayed every time you start RealTime by checking the “Poll Clock on Load” option in the program options

1. First install your data clock and prepare it for serial polling. See the RealTime Data Clock manual for instructions on clock setup.
2. Next, select the “Serial Polling” action of the “General” category
3. Select the RS232 port (Comm Port) to use, normally 1 or 2. This selection will be remembered automatically.
4. Choose either “F” (Collect Records) or “W” (Who’s In Query) as the Poll Type
5. Finally, simply click the OK button to poll the terminal.

You should NOT use Serial Communications within RealTime if you need to collect your data at a regularly scheduled time or any of the 3 conditions listed above cannot be met.
Installation of Communications

RealTime Communications is automatically installed with the RealTime program. Start RealTime Communications by selecting it from your Start Menu programs, in your RealTime group.

Before your Communications software can function properly, your chosen connection method must work properly.

**Ethernet**

For Ethernet, you should be able to use your Ethernet network for other tasks. You should be able to use IP addresses to locate other devices on the network. Your intended Time Clock location should have the network cable installed and tested. You may need to have a system administrator available who can help you with IP addresses and IP masking issues. RealTime Communications may rely on an Ethernet converter to enable some terminal types to connect through your Ethernet network. In these instances, you will setup your communications software as Direct Serial, specifying the COM port that has been configured to use the Ethernet driver and converter.

**Serial Network**

For a Serial Network, you must have an available serial port and an approved RS232 -> RS485 converter. Proper cabling must be connected in a “Daisy-Chain” type configuration from the converter to each of the Time Clock terminals. The length of the cabling should be 4000’ or less from the converter to the final terminal.

**Direct Serial**

For direct serial you must have an available serial port on your computer. This port must be in the range of COM1 to COM4. Proper cabling must be connected between your serial port and the time clock terminal. The length of the serial cable should not exceed 200’

**Modem**

For modem based communications, you will need to have a modem installed in or connected to your computer. The modem needs to be configured to use a Windows communication port in the range of COM1 to COM4. Additionally, you will need to have an analog telephone line connected to your modem, and another (different) analog telephone line connected to the time clock modem.
Setting up RealTime Communications

Once you have the Ethernet, Serial Network, Direct Serial cable or Modem installed, you are ready to configure the Communications software. Select the Setup dialog box by pressing the Setup button.

Make your selections from the following settings:

Com Port: Select the COM port to which your modem or serial connection is attached. For Ethernet connections that use a Serial -> Ethernet converter, specify the COM port that the Ethernet driver/converter is installed on.

Transmission Method: Select Modem, Serial, LAN (Serial Network) or RSI Ethernet for your communication method.

Terminals: This message appears only if the LAN (Serial Network) selection is made. Enter the number of time clocks that are on the serial network. Communications will attempt to receive data from time clocks with ID numbers from 1 to the number specified here.

Modem Pause Time: These selections are reserved for unusual modem situations where timing may be a problem in resetting the modem. Generally, Modem Commands entry is set to 2 and Initialization is set to 3 or 4.

LAN Pause Time: Adjustments to this field are occasionally necessary for compatibility with different systems and the speed that they are able to switch between send and receive mode. Normally the default of 1.1 works well, but slight adjustments (0.8~1.5) may be beneficial if you are receiving a high incidence of packet errors.

Modem Listing: Use this menu to select the brand of modem that you are using. If your modem is not listed, select Custom from the list, which allows you to type in the required Initialization String. If you wish, you can leave the initialization string empty and a default initialization command will be used.

Initialization String: The initialization string is used to set up your modem for communications with the time clock. In addition to turning on certain features of the modem, it is also used for disabling data compression and error correction on your modem. Some of the time clocks cannot use these features, so they are turned off during communications. Your modem will be restored to its previous settings by the other software products that use your modem. If your modem brand or model is not listed, try using the Generic or Generic Kingston option. You may also select Custom and enter your own initialization string.

Begin Time: The Begin Time turns RealTime Communications on at the specified time. Enter the 24 hour time you wish to turn on the operation of the communications. This feature works in conjunction with the Auto Start method to determine what method of communication will be executed. If you leave the setting on NONE, you must press the Host, Auto or Call button to start the communications process. By using this feature, you can leave RealTime Communications launched all the time but only start it when it is needed.

End Time: The End Time turns Communications off at a specified time. This is especially helpful if you are using a voice line for nightly Time Clock uploads and you need the line to return to Voice mode after all your terminals have communicated. Enter the time, in 24 hour format, that you want RealTime communications to End.
**Company Database:** Use this field to specify where your company database is located. It will default to your RealTime data directory, but you can change if necessary.

**Clock Name:** This option only appears if in certain configurations. If it appears, then you will need to select the appropriate company file to send any time clock data that is received.

**AutoStart Method:** To automatically initiate either Host mode or Poll mode whenever RealTime Communications is started, then select the desired mode here. The Host option is for receiving time clock calls only and the Poll option will initiate outbound communications as scheduled. The Poll option will also accept inbound communications that occur between outbound events. This feature will effectively allow you to automatically startup in “Auto” mode simply by selecting Poll as your AutoStart method.

**Terminal Type:** The terminal type is the brand of time clock you are using. VeriFone data clocks are ZON, AccuTime Systems data clocks are ATS. Handpunch units from Recognition Systems Inc. are RSI. The handheld wand from MacSema is a Mobility terminal.

**Batch Processing:** This option is used if you have installed multiple clocks and want to match transactions coming from multiple clocks automatically.

---

**Note:** Matching Transactions is the process of linking the Start portion of a time span with its corresponding End portion, creating a Complete transaction.

---

Pressing this button displays the schedule form for creating the matched transactions. The process of Matching will be triggered as scheduled only if a download has occurred.

Each entry in the batch-processing schedule consists of a clock/clock name, a day of week and a time entry for the processing to take place. Remember to schedule every day of the week that you wish to have the process run automatically. Be aware that the Matching process will not run if RealTime Communications is not loaded when the execution time occurs.

---

**Note:** You can also match transactions within RealTime as you start, or as desired by selecting Match Transactions from the Utilities menu.

---

**Save and Cancel buttons:** You must press the Save button to save your modified settings. If you choose Cancel or click the “Close Form” X in the upper left corner, your changes will be discarded.
Using RealTime Communications

RealTime Communications is an information handler. It receives punch information from the time clocks and delivers it to the RealTime database files. It will also receive settings such as validation tables from the RealTime database and deliver them to the time clock. RealTime Communications is a small but effective program that facilitates the interaction between RealTime and your electronic time clock. In order for the Time Clock data to properly transfer to the correct database, the company must already be set up in the RealTime software. If there are no companies set up, the communications program will not know where to save the incoming time clock information and therefore, will not work.

Load RealTime Communications and it will open to an information window. The top of the window has some buttons that you will use for starting, stopping, configuring and review purposes.

Navigating Communications

If you have selected one of the Auto options in the Setup, and you wish for the automated process to occur, then you are done. Leave the program (and your computer) running and let the communications process take care of things as you configured it to do. If, however, you are not using an AutoStart method or you wish to override the default AutoStart operation, then proceed with the following steps.

Any buttons that are grayed out are not available at the moment. This occurs when RealTime Communications is in the middle of a process that should not be interrupted, when the desired function is already running, or when the desired process would conflict with another running operation.

Note: To Cancel an AutoStart, or to abort an ongoing communication process, click the End button.

If you have not set up AutoStart, select from one of the following options:

Host: When you select the Host mode, you are ready to receive a communication from the Data Clock, initiated by the Data Clock, at a time either automatically set at the clock or manually started. Host mode is the most common method to have data transmitted from the clock. Click on the Host button (or Alt-H) to start communications in Host mode. Host mode is used for LAN communications.

Auto: The Auto mode originates calls from the PC to poll one or more Data Clocks. Calls are automatically made by Data Clock Communications based on preset dial times. Click on the Auto button or press Alt-A to start. When you press the Auto button, a form is displayed on which you may also add additional events before beginning the communications session. Any item without a dial time is skipped. If a call is unsuccessful, two additional attempts will be made before going to the next item.

Call: This feature functions much the same way as the Auto button except is intended to make one or more calls in sequence without respect to the time. When the Call button is pressed, the list of locations appears in a dialog box. Click in the Selected box to change the selection to Yes and press the Begin Poll button. You may also enter new locations at this time. Only items with Yes selected will be dialed. Dial times are ignored with this feature. Each item is dialed until the last item with the Yes option is completed.

Note: Clock polling information can be also set up in RealTime by selecting the Polling Table option from Setups menu in the main switchboard.
**End:** Pressing End stops communication with the modem and resets the port. You must press End before you exit or use the setup options in Data Clock Communications.

**Setup:** Setup opens the dialog box to set up the communication parameters. Refer to the Setting Up Data Clock Communications section on page 55 for more information.

**Log:** The Log button opens the communications log of all communications activity. Refer to the Communications Log section on page 61 for more information.

**Exit:** Pressing Exit ends the session and closes the Data Clock Communications window.

---

**Caution:** Be careful not to press the End button during or immediately following the end of a call. Even though the call is complete, it takes several more seconds to complete the transfer to the database. Watch for the Transfer Complete message or the blue transfer bar in the lower right corner to complete before exiting.

---

**Monitoring Activity**

RealTime Communications provides several features to help you monitor what is happening in the communications process. In the upper right hand corner of the Communications screen, you will notice two indicators marked SD and RD. These are Send Data and Receive Data indicator lights, much like the ones on an external modem. When these are flickering, data is being transferred between the Communication program and your time clock terminal.

At the bottom of the window is a status bar which reflects the connection information. This is updated every time you make changes in the setup window.

The main window of RealTime Communications provides an immediate status of all activities with date and time information. This can be printed by selecting File, Print from the menu.

Key elements of this information is also stored in the Communications Log file.

---

**Exiting Data Clock Communications**

When you have completed using RealTime Communications, you may exit by clicking the Exit button or clicking the “Close Form” X in the upper left corner. If the Exit button is not available, then you must click the End button to finalize and cancel any current processes.

---

**Your Time Clock Choices**

As you have undoubtedly noticed, RealTime Communications supports multiple Time Clock choices. This section is designed to give you the specific information you need to use the time clock you have selected.

**Verifone Terminal, - (ZON/TRANZ)**

The ZON and TRANZ model are our most versatile terminals. They are robust and inexpensive, yet support a wide array of features. Verifone terminals can be used in multiple ways. The ZON 53x and the TRANZ 330 models can use Direct Serial, Modem, or, through an adapter, Ethernet, to deliver their data to your RealTime system. The ZON54x models utilize a Serial Network for information delivery.
Direct Serial

There is very little to do for the Direct Serial configuration of your Verifone time clock. RealTime Communications supports this terminal in inbound mode (Host), outbound mode (Poll), or both. You will need to have your terminal connected to an available com port using a serial cable. In your program Setup screen, you will need to have the proper port selected in the Com Port section, have Serial selected as your Transmission Method and have ZON set as your Terminal Type. RealTime will use the Terminal Name you have assigned in the Time Clock to locate the proper database to deliver your transaction information to.

Modem

Your terminal has two Modem ports built in. Simply plug your analog phone line into one of them to use it. If your terminal will be expected to answer calls from the computer, then you must set MODEM to true (1) and DIAL POLL to true (1) in the configuration of the terminal.

If, however, your terminal will initiate the telephone call, then you will need to specify MODEM to true (1), set the UPLOAD TIME (Format = HHMM) and also provide the proper UPLOAD PHONE. When providing the Upload Phone number, remember to provide any needed line access numbers or codes. Use the “-“ (hyphen) for a ½ second pause during the dialing sequence and use the letter “W” to cause the terminal to wait for a second dial tone.

Ethernet

Configure and use your communications software exactly like you would for Direct Serial. The Com Port you need to specify is the one that you have set up when you installed your Ethernet Converter Drivers. See the Section on Ethernet Converter for specific information about configuring and using the Ethernet Converter.

Serial Network

This method is a continuous communication to each of your installed terminals. You must use Host mode to initiate it and it will obtain transaction data from each terminal as it occurs. In your program Setup you will need to specify the com port where your Serial Network adapter (RS232->RS485 converter) is installed, specify LAN as your transmission method, specify ZON as your terminal type, and choose your destination company from the “Clock Name” dropdown list.

Recognition Systems, - (HandPunch)

Please Refer to your HandPunch documentation for information on configuring these time clocks.

These terminals support Direct Serial, Modem, Ethernet and Serial Network

Direct Serial

To be Added…

Modem

To be Added…
Ethernet
*To be Added...*

Serial Network
*To be Added...*

**MacSema Terminal, - (Mobility Wand)**

Direct Serial
*To be Added...*

Modem
*To be Added...*
The Communications Log

The Communications Log provides an important view of all the individual activity that occurs while the Communications program is running. This log helps in troubleshooting problems that may have occurred during communication sessions. You should inspect this log periodically to insure your downloads are occurring on a regular basis.

The Communication log may also be viewed from within the Communications program by pressing the Log button.

It may also be viewed without opening communications by double-clicking on the RealTime Log icon in Program Manager, or selecting Run, Programs, RealTime, and Communications Log in Windows 95. Choose whether you wish to view, print or purge the data. Press the desired selection and enter the date range you wish to view or print.

The important part of each transaction is determining whether the Data Clock completed its upload or not and whether the data transferred to the RealTime database. Any errors are listed on the log and are self-explanatory. If you receive many errors, contact your help desk for more information.

To purge old information, select the Purge button and enter the date before which you wish to purge the data. For example, if you wish to purge all transactions before March 16, 1996, enter 3.15 (or alternately 3/15 or 3/15/96) as the purge date. RealTime log data can be purged anytime after you have received your downloads.

Data should be purged once a month to keep the files performing quickly. Failure to do so will consume additional hard drive space.

Note: You can also view logs using the RealTime Log icon from Program Manager. The reports are formatted for easier reading.
**The Bad Punch Log**

The Bad Punch Log contains any punches that may have transferred incorrectly. Most of the time these punches will have transmitted fine on a subsequent attempt. They can then be deleted from the file once verified in the RealTime database file.

Deleting reviewed punches is simple since this file is displayed using the Windows Notepad or Windows 95 WordPad. Highlight all the punches to be deleted and press the Delete key on your keyboard. Then save the file using the File, Save command (Alt-F, S). To exit the Bad Punch Log, select File, Exit from the menu bar (Alt-F, X).

If you have a significant number of bad punches, you may want to examine your communications to insure settings are correct and cables are in place. If the problem continues, contact Technical Support.

**Backup Files**

In addition to updating the RealTime database files, Clock Communications creates two extra archive files to store the ASCII data as it comes in from the Data Clock. These serve as an extra audit and security feature to your timekeeping system. They may also be used to rebuild RealTime database files should they become corrupted or destroyed.

Each communication transaction has a backup file associated with it. It is named using the date combined with a counter. The file ends in the extension TCD. The first file created on July 4, 1996 would be 07040001.TCD. These files are saved for 10 days and then automatically deleted by the Data Clock Communications.

**Technical Note**

Should the need ever arise, a second file that has the same name as the company directory and ending in the extension .ARC maintains a continuous backup of all punches. For example, if the name of the Data Clock is REALTIME, the archive file is named REALTIME.ARC. The ARC file is located in the same directory as it has been named. If you are using the standard setup defaults, the data would be located in C:\RT3.1\REALTIME\REALTIME.ARC.

You can view these punch backup files with any ASCII text editor such as Windows Notepad, WordPad or Write. Data can be imported from either of these files or cut and pasted into another text file for a special import into the RealTime database.

To manually import a clock file, use the tools built into RealTime.

**Polling Clocks for Data**

While many installations will rely on the clock to upload data to the PC placed in Host mode, there are some situations that will require the PC to initiate the polling. Ideally, polling requires a dedicated phone line or extension number for each Data Clock so that it can answer the phone without conflicts from other devices.

Clock polling information can be set up in either of two places:

- From the main switchboard, Setup menu, select Polling Table, or
- In RealTime Communications, press the Auto button.

Setting up polling involves entering the phone information, download type and dial times.

The following fields are entered into the Clock Polling Selections form:
**Location ID:** This is the number of the clock assigned to this location. It is helpful for looking up results in the RealTime Log file.

**Location Name:** This is the description of the location.

**Location Phone:** This is the telephone number or extension number that RealTime Communications will be calling. Add any necessary prefixes that are required for your system. For example, if you need to dial 9 to get an outside line, enter a 9 before the telephone number. If your system requires a pause, use a comma (,) for each one second pause. Dashes in telephone numbers are ignored.

**Select:** This is used for selecting items for Manual dial up. When Call is selected from the RealTime Communications screen, all items with the check box marked or “Yes” entered, are called. If Auto is selected in RealTime Communications, the check box or Yes/No in the window is ignored and only items with Dial Times entered are called.

**Dial Time:** This is the 24 hour time you enter to have the clock polled. No entry will cause this clock to be skipped. That way you can maintain entries for non-recurring locations.

**Type:** This refers to the type of download to be processed. Valid entries are:

- A full download empties all data from the clock.
- A partial download empties all closed or completed punch transactions and all transactions older than 24 hours.
- The Who’s In download provides all the clock information in a temporary transaction table that does not affect permanent time transactions.

**Option** Setup information for polling clocks may also be entered when you press the Auto or Call buttons in RealTime Communications.

Clock polling is executed by pressing the Auto or Call buttons in RealTime Communications screen. The Auto button will poll based on times assigned, while the Call button calls all clocks with Yes selected.

Once changes have been made to the polling selection, press Begin Poll.

When you use Communications on a regular basis, you may choose the Auto option in the Communications Setup form. It can be selected with the Polling option. When this is selected, auto-polling is automatically started when you launch RealTime Communications.

You can further automate the use of RealTime Communications to make the modem available during specific times for other programs. This is accomplished by setting Start and End times in the Communications Setup form. The Start time begins the RealTime Communications process and the End time stops it. During the period not selected, the modem is not being held by RealTime Communications.
To insure reliable data transfers, take some time before implementing RealTime on a daily basis and decide how you will handle the communications process.

For example, putting RealTime Communications in the Startup Window of your Program Manager will insure that Communications is loaded every time you launch Windows. Taking advantage of the Automatic Start and End Times in the Communications Setup window will release the line during inactive periods and allow the use of other communications packages to be used while RealTime Communications is inactive.

**Note:** Be sure to leave your computer on if you have after hours data communications occurring.

### Multi-clock Installations

The multi clock option supports employees punching in on one clock and out on another. This is useful in large companies where employees work in many different locations and in operations that utilize job costing with multi-clocks.

All the transactions for the multi-clock (or LAN-based) system must be matched. As the data comes into the PC from the Data Clocks as raw punches, you must arrange to have the punches joined on the PC. There is a variety of methods to match transactions, depending on your particular needs.

There are three methods for matching punches:

1. **BATCH PROCESSING IN COMMUNICATIONS** involves setting up a schedule that allows Communications to perform Matching at preset time(s)

2. **MANUALLY MATCH TRANSACTIONS** from within RealTime. See your RealTime documentation for more information.

3. **AUTOMATCH TRANSACTIONS** from within RealTime. See your RealTime documentation for more information.

### 1. Batch Processing

The schedule must be set up to batch process multi-clock installations in RealTime Communications, as follows:
1. Press the RealTime Communications icon in Windows Program Manager. In Windows 95, select Run, Programs, RealTime, then RealTime Communications. At the above screen, select the Setup button. The following screen is displayed:

2. Press the Batch Processing button. The following screen appears:

3. Click in the box under Clock Name, select the down arrow that appears and select a clock name by clicking once on your selection. The company description appears alongside the code for clarification purposes.

4. Select day of week for transaction matching to take place by the same method. Make your selection by clicking once. Move cursor to time and type in the time you wish multi-clock punches joined for that day.

5. Repeat this process for every clock name (company).

   Note: If you wish daily joining of multi-clock punches, you must repeat this process for each day of the week for each clock.

6. Close RealTime Communications before returning to the RealTime program.

   Note: The batch processing activity is executed only if a Data Clock download has occurred during the current session.

If you experience problems in getting match transactions to work, check all event timing and schedules.

2. Manually Match Transactions
3. AutoMatch Transactions

These processes are covered in detail with your RealTime software manual.
Advanced Communications

Overview of Advanced Communications

This section contains details for the advanced user for telephone, serial and RS485 LAN installations. Refer to Chapter 6 - Data Clock Communications for basic set up information.

Behind the Scenes…

To maintain a high degree of security for your time data, the system introduces a series of steps that insure a controlled flow of data from beginning to end.

1. When clock data is sent to Communications, each punch is checked to be sure it is received correctly. Only when Data Clock Communications is certain all punches are received correctly will it send a special code to the Data Clock to erase the current batch of punches.

2. If bad punches are sent from the Data Clock, Communications will request they be sent again until correct. If a problem is occurring due to a bad connection, the Clock will hang up after 5 attempts and then will call again up to 5 times. Each communications transaction is logged in the .LOG file located in the \RT3 directory. Access this information by selecting the RealTime log icon in Program manager and indicate the dates to view.

3. To keep communications running smoothly and to free the communications line quickly, the initial data is transferred as an ASCII file. This file is in turn automatically imported to the RealTime database with an identifying name based on the date and a counter number, ending with the extension .TCD. It is then appended to another ASCII file that begins with the Data Clock name and ends with the extension .ARC. TCD files of each communications event are saved for ten days.

4. If for any reason the database becomes corrupted or disappears or there are bad punches detected, the whole ASCII data set is not placed in the RealTime database table. An error is set in the Communications Log file and the offending punch, if there is one, is placed in a file called BADPUNCH.TXT. This file may also be viewed with the Windows Notepad and is easily accessed by selecting the Bad Punch icon from the RealTime window in Program Manager.

5. If this situation occurs, you can view the Data Clock data file using Notepad or Wordpad or another text editor and correct the offending data. Save the bad punch into a file named the same as the Data Clock name, (also the current directory name). Then using the Import button on the RealTime Main Menu, you can re-import the data. See Chapter 22 - Importing Data for more details.

Testing Communication Ports

To assist you in determining your communications options, use the port testing program provided with RealTime. To test your ports, exit Windows and change to the \RT3 directory by typing CD \RT3 at the DOS prompt and press Enter. Type PORTTEST and press Enter. Follow the directions on the screen. For complete instructions on using this utility, refer to Appendix A - PortTest.

If you have MS DOS version 6.0 or later, there is a utility included that will assist in determining ports and communications. Type MSD at the DOS prompt. See DOS Help or your DOS manual for more information on MSD.
Telephone Line Considerations

Having a good telephone connection is essential to good communications and this step often gets overlooked in the installation process. Here are some important tips to remember:

Do not share a phone line that will be answered with another device that has the potential to pick up at the same time as the PC or the clock. For example, if you plan to poll a clock, do not plug it into the same line as the fax machine. However, if the clock is going to be an originate only it can be shared by the fax.

You can share the line with a fax machine provided the RealTime device originates the call and does not answer. A way around this situation is to install a fax/modem sharing device. Not all of these devices work well consistently, so be sure to test before proceeding.

Also, you should not share the line with a Key Service Unit (KSU) or PBX system without proper isolation. This can be installed in the form of a line exclusion device by most phone installation service companies.

Do not plug your modem or Data Clock into the same outlet as a digital or electronic phone system. It will not work and may cause permanent damage to your phone system.

Check your internal lines for cross-talk. If you can hear another phone conversation while you are on the phone, you have a severe cross-talk problem. Data will not transfer until this is corrected.

Installing into KSU and PBX Systems

Many businesses today have an electronic phone system or central office system that does not support the direct installation of an analog phone device. Those that do may require special programming before installation occurs. See your phone installer before proceeding.

You can install in tandem to a KSU or PBX system without using the ports by looping around the system and connecting directly to the trunk lines coming into your building. If you do this, line exclusion devices must be installed to prevent conflicts.

The ideal installation is to use analog ports off the KSU or PBX system whenever you have an in-house installation. In general, these systems tend to be the most reliable. To program your dial sequence, all you have to enter is the extension number of the Data Clock or host PC.

If you are having problems getting clocks to answer or dial the PC, check to see the system is providing the following specifications:

- Voltage 40-130 v rms
- Frequency 20-45 hz
- Cadence 2 on - 4 off

Setting up Modem Communications

Selecting the Right Modem

Begin by installing a modem in your Windows-based computer that supports a minimum 1200 baud speed. Most faster modems will work fine. Check with your dealer for a current list of approved modems.

It is recommended that you add phone line surge protection to your system for your
modem. This will prevent the risk of damaging your computer or modem due to phone line electrical surges. Most manufacturers of surge protectors offer models with modem surge protection. Check with your dealer for more details.

A standard Hayes compatible 2400 baud modem will work most of the time. However, some high speed modems may not work with RealTime Data Clocks due to error correction and data compression features. Since more and more manufacturers have these features turned on, you will have to supply the commands listed in your modem manual to turn them off. Refer to the Initialization String section for more details.

Setting up communications on the PC can be tricky. Most popular brands of modems will work fine with RealTime, but only when error correction and data compression are turned off. For the easiest installation, an external modem is recommended.

Please make sure your modem is operating correctly before attempting to transfer data via Data Clock Communications. If you can answer and receive any file with your modem using the Clock program in Windows, Data Clock Communications will usually transfer data successfully.

Note: Be sure your modem is tested in the Clock program before calling for technical support.

Select the Right Ports and Interrupts

The most common modem conflict problems stems from having two devices on the same COM port or having two devices on different COM ports but the same interrupt.

On some PC's, you may have a problem with your modem even if it appears there is an unused COM port. For example, you may see that nothing is plugged into COM2, but your internal modem is, at the same time, set for COM2. This may cause a problem. In some cases, the modem may work, but in some cases you may be able to dial out but not receive inbound data transmissions with this configuration.

It is also very important that the interrupt (or IRQ) of the modem port or serial port is not shared with any other device such as a mouse or printer. In other words, do not use COM1 and COM3 together or COM2 and COM4 together if these combinations share the same interrupt.

The following illustrates common sharing of interrupts between COM ports:

<table>
<thead>
<tr>
<th>Port</th>
<th>Interrupt</th>
</tr>
</thead>
<tbody>
<tr>
<td>COM1</td>
<td>IRQ4</td>
</tr>
<tr>
<td>COM2</td>
<td>IRQ3</td>
</tr>
<tr>
<td>COM3</td>
<td>IRQ4</td>
</tr>
<tr>
<td>COM4</td>
<td>IRQ3</td>
</tr>
</tbody>
</table>

The simplest and quickest solution to modem installation is to use an external modem plugged in to an available serial port. If you are already using COM1 with your mouse, make sure the modem is plugged into COM2.

The next best setup is with an internal modem placed on the COM3 port, with the mouse being moved to COM2. (This may require a 25 - 9 pin adapter.)

After you have selected the appropriate settings, press the Begin button to start the Communications program. If the correct port has been selected, there will be a message displayed that says, "Waiting for call". If you do not see this message, you may have to check to see if there are any conflicting devices on the same COM port.

Communications may be run in the background while you run your other Windows programs.

Note: Some screen savers may cause interference during the communication process. You may use the Blank Screen option under the Screen Saver.
Initialization Strings

One of the challenges in getting communications to function correctly is making sure the modem in your PC and the modem in the clock are using the right protocol. Your modem may work fine when communicating with another PC but not with the RealTime Clock. This is because all the 53X series clocks use a Bell 212A modem. While this standard has been around a long time, most modem manufacturers do not support it as shipped. In order to permit your PC modem to talk to the RealTime Clock, you must send it commands using initialization strings.

There are many commonly used modems to choose from in the Setup window of Data Clock Communications. However, if you cannot find your brand, you will have to create your own initialization string or replace the modem with a more popular brand.

There are several commands that are common to all modems. The starting code of AT begins all strings. E1Q0V1X4S0=1 generally appear at the end of the string. Beyond that there are very few standards among modem manufacturers. You must also have carrier detect turned on which is usually &C1 and DTR control is generally set to &D2.

The important issue to resolve in getting your modem to work is to find commands to insert in the initialization string that turn off data compression and error correction. There is also the possibility that a string is available to execute Bell 212A compatibility. The Bell 212A string is usually B1 but on some brands, does not function.

Experimentation with strings will not hurt your modem. Strings that are incorrect and not understood by your modem will produce an error message when you attempt to start communications.

Following is a listing of some popular modem initialization strings:

"Boca","AT&K0C0&Q6&D2&C1V1X4S0=1"
"Best data SmartModem 1","AT\N0C0&K0N0&Q6&D2&C1V1X4S0=1"
"Cardinal FaxModem","AT\FB1&C1&D2N0S37=5&Q6S0=1"
"Generic","AT\N0C0&C1&D2V1X4S0=1"
"Generic Kingston/Highspeed Zoom","ATB1&C1&D2&K0V1X4S0=1"
"GVC","AT\N0Q0B5\K3&D2&C1V1X4S0=1"
"Hayes Accura","ATB1&C1&D2&K0V1X4S0=1"
"Intel Satisfaction (all models)","AT\FB1\N0Q0J0V0H0-J0S0=1"
"MaxTech","ATB1E1C0%G1Q0V1X4S0=1"
"Practical Peripherals","ATB1\N0C0&K0N0&D2&C1V1X4S0=1"
"Practical Peripherals PM144HCII","ATB1&K0&Q0&D2&C1V1X4S0=1"
"US Robotics Sportster","AT\FB1&B1&H0&K0&M0&R1&I0&N2&C1&D2B0V1X4S0=1"
"Zoom FaxModem 14.4 PC","AT\FF4B1&D2&C1V1X4S0=1"

There are three important steps to setting the initialization string. First you must turn data compression off. Second you need to turn error correction off. Third, it is often helpful to lock the port speed at 1200. It is also helpful to set auto-answer to one ring.
If you are supporting installations with multiple modems. You can add the strings to the file MODEMS.TXT. Then your initialization option will appear in the drop down box of the communications program.

When Communications is complete a string is sent to your modem to return it to its original settings.
Troubleshooting Communications Connections

"Nothing happens when I press the Begin Button."
"I get the "Waiting for call" or "Waiting for upload" message and the modem sometimes answers the call. Then nothing happens."
"The modem appears to hang up without completing the call."

There are many variables that can affect communications not working. They can range from partially working modems to conflicts with other devices in your computer or incorrect initialization strings. Technically speaking, these conflicts are caused by two devices sharing the same COM port, interrupt (IRQ) or I/O base memory address. In most cases, a modem has been installed in a machine with a conflicting port assignment. The modem is often sharing either COM1 or COM2 with the computer's serial ports. This is easily remedied if you do not have a mouse attached to one of the ports (Some computers come equipped with a bus mouse that does not use the serial port.) If you do not have a mouse or other serial device attached to the computer, configure the modem on COM3 or COM4. (You may also disable one of the computer's COM ports and then assign the modem to that port. Check with your computer dealer or modem manual for instructions on doing this.) If you do have a serial mouse attached to your computer, you must use the odd numbered alternate port for your modem if the mouse is attached to an even numbered port and vice-versa. For example, if the mouse is attached to COM1, you need to place the modem on COM4. If the mouse is on COM2, the modem is placed on COM3. The reason that even and odd ports cannot be shared is that they often have the same interrupts. The program that attempts to call each device on the same interrupt basically gets confused and causes abnormal behavior, including hanging up the computer.

If you have additional serial devices attached to your computer, you need to consider whether they are activated at the same time as Communications. For example, a serial label printer would generally not be a conflict if you are not printing at the same time Communications is active. In this case, the serial printer could occupy an even or odd numbered port with the modem. The printer could be on COM1, the mouse on COM2 and the modem on COM3.

"My computer is attached to a network. When I logged in to the network, Communications does not work. Without the network, it seems to work fine."
This may be a conflict with the network card. Check the I/O Base and interrupt assignments on the network card. Try moving them to another location. Sometimes the network card is assigned to location h300 in conflict with some brands of modems. The network card is generally more flexible in configuration than the modem. Also, many network adapters are set to IRQ3. Change it to IRQ5.

"I have a fax/modem. The fax works but the modem does not."
First be sure that conflict problems are resolved as in the above. Even though the fax works, the modem may be a bit more sensitive on receiving a call on a conflicting interrupt. Be sure to disable auto answer on the fax software and any other drivers that might prevent the modem from answering. Even though some fax programs will distinguish between a fax and a modem call, the time may be too long for the data clock. The data clock will time out and hang up before Communications can get a connection.

"I am using a fax/modem/voice switch. The Data Clock dials up OK but it displays the message: "NO ENQ FROM HOST"
The problem is the switch takes too long to hand the call to the modem. Try a different brand of switch or use a different telephone line. Be sure to check that all data clock connections are secure. Try plugging the modem into the voice option.

"Occasionally the modem hangs up or shows many "PACKET RESENT" errors in the log."
This may indicate a noisy telephone line or a bad modem. Check to see if telephone line is running next to copy machines or other "noisy" equipment. Too long a flat cable can be more susceptible to noise, so replace it with twisted pair cable. Too many old connections can also be a problem. Sharing lines with key service units or PBX centers may also cause this problem. Consider running a new line to where the telephone company has entered the building. Finally, call the phone company to check your lines for cross-talk and interference.

“My modem dials out fine. Data Clock Communications does not answer or does not respond after a connection.”
This can be due to several situations. First check to see that data compression and error correction initialization strings have been used correctly to turn off these features.
Check to see the computer has 8MB of RAM. Opening the internal log files and the database will cause the computer to hang due to insufficient memory.
If you are using Windows version 3.1, be sure you have Share installed correctly. See the section on Share. Be sure BUFFERS in Config.sys are set to BUFFERS=40.
If you are sharing the line with your company phone system, the ring detector may be actuated at the same time as the modem. Line noise may end up causing the communications program to hang.

"How can I go about diagnosing problems?"
If you are fairly familiar with the inside workings of a PC, attempt the following tests and procedures:
1. Turn off your computer and remove all unnecessary cards from the PC including network, scanner, tape compression, CD-ROM controllers and others.
Leave in only the modem, disk drive controllers and video card. See if this clears the problem. If your computer is equipped with two serial ports, be sure to move the modem to COM3 or COM4 as described above.

Test the modem with the Microsoft Windows Clock program. If you can send and receive calls with Windows Clock, Data Clock Communications should successfully transfer Data Clock files. If Clock works and Communications does not, call Tech Support for further suggestions that may include replacement of the modem with a different brand.
If there are many serial port conflicts found, one solution is to purchase a bus mouse to replace your serial mouse.
Once you have found a successful combination, add each board back in to the machine one at a time. Test several times after each board is added to make sure it is not creating an additional conflict.

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Important: Do not change any cards in your computer without first turning off the power. Unless you are familiar with the settings inside your PC, contact your dealer or consultant.

5. Check Port Settings in the Windows Control Panel to be sure they are correct. Data Clocks send at 1200 baud, 8 bits, No Parity, 1 Stop Bit.

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**Special Considerations for Serial Connections**

The same rules apply to serial connections as they do to modem connections regarding port and interrupt control. However, cable distance is an issue as signals tend to degrade more over longer runs.
If you provide your own cable, you need to be concerned about distance and shielding. Anything under 50 feet will be fairly fault tolerant provided the cable does not cross over motors or fluorescent light fixtures. Using shielded cable will cut down on potential problems when crossing appliances that give off electrical "noise". Shielded cable is a must in installations up to 200 feet. Installation over 200 feet may require additional amplification. Call for details on custom wiring issues.

**Note:** Data Clocks do not automatically come equipped with serial cables. Be sure to specify whether you are connecting to the 9-pin or 25-pin serial port on your computer and specify the length of cable required.

If you are using multiple clocks in your installation, you will need an automatic serial sharing device. Contact your dealer for recommendations.

**Special Considerations for RS485 LAN Connections**

The rules for setting up the RS485 LAN from the perspective of the PC hardware are the same as the serial connection. The only difference is that a converter is added to the serial port of the PC to convert the protocol from a serial to RS485.

The software setups are described in Chapter 6 - Data Clock Communications. It is important to match the number of clocks being polled to the number of clocks on the LAN.

Although it is not recommended, users may supply their own RS485 converter. It must be set up to handle a half-duplex signal controlled by the RTS signal. It should be DCE selectable.

The device provided by your installer is a modified QVS IC-485S. Since this device has been specially modified for this network, do not substitute other OEM equipment.

There are two ways to prepare the wiring on your site. You may pre-install RJ11 jacks and then simply run a RJ11 plug terminated cable from the clock to the jack. Or simply run a separate RJ11 terminated cable from one clock to the next. In either case the cable should be configured as straight through connection. The PC may sit anywhere along the network line, however if it sits anywhere but the end of the line a line splitter is required on the RS485 converter.

If the LAN fails, check all cables, then check the RS485 converter. Make sure the switches are set to DCE and T-RTS/Rx on. Make sure the converter is plugged into the PC and the power adapter is plugged into a surge protected AC source.

See the RealTime Data Clock User Manual for more details on RS485 wiring.

**LAN Operations**

The PC continually polls the clocks for data. If the LAN is disconnected, punches are saved to a batch. Once the LAN comes back up the punches are automatically sent to the PC. If the batch process is setup, the punches are matched into time transactions on a scheduled basis.

If the LAN is disconnected or the PC software is terminated, the clocks will continue to save entries until the it is reconnected. The clocks will display the message LAN DISCONNECTED about every seven seconds until the system is restarted. This message is also displayed during batch processing. Batch Processing should be timed to take place during low use periods. Although data is still retained at the clock, users will be less likely to be concerned about the LAN DISCONNECTED message.
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