

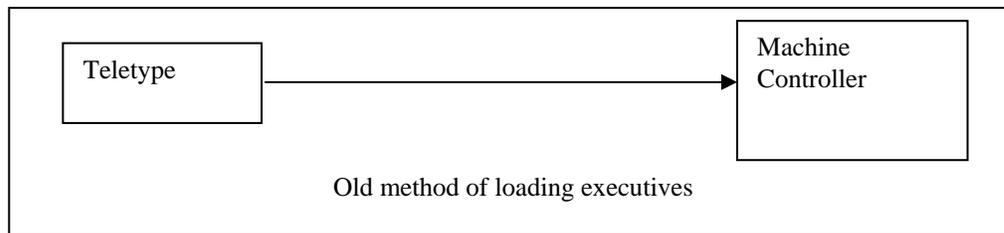
Purpose

This document will help you understand communications between a UIC machine controller and a PC. Please refer to the 8221, 8222 or J11 documents for more detail on each specific controller type once you have read this document.

Communications

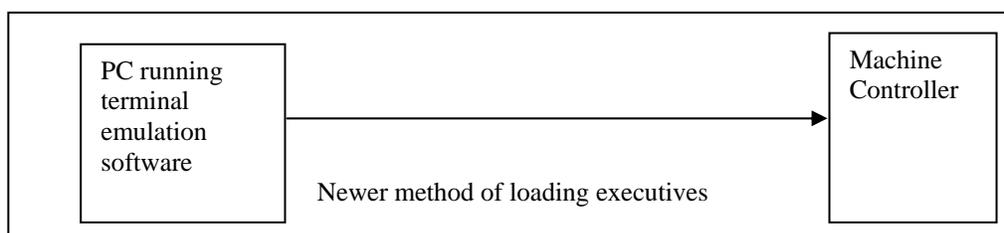
Establishing serial communications between the PC terminal and the machine controller requires that both the PC and controller have the same port settings (i.e. baud, data bits, stop bits, parity, pacing control. When changing the baud rate on the terminal, the baud rate setting on the controller interface board must also be set.

Understanding the communications protocol will help make decisions about the communications parameters. All of the 822x UIC controllers are based on a paper tape load system. This system in the past would use a paper tape reader connected to the console port. When the reader read the characters (bytes) from the paper tape, they would be transmitted to the console port on the controller. Unfortunately, the paper tape load technology did not employ any form of error checking such as checksums. This said, the system worked well because the inherent mechanical constraints provided ample delay for the character transmission and receipt at 300 baud.



Newer method

Terminal programs such as K-Host, B-Talk, Insercom and UCTII are actually terminal emulation programs, which emulate old ATT Teletype/papertape reader equipment. All programs work well but some have added features that help ensure the executive will load at any baud rate. A PC running at 1GHZ will transmit bytes much too fast for machine controller to receive and store so some methods of slowing down the load must be employed. While UCTII software allows a delay to be entered between the issue of the starting address (17 773 000G) and the actual executive load, it does not have a user configurable pacing delay between each byte of the executive. Consequently, UCT II may need to be configured for a lower baud rate in order to load executive programs error free. Other programs such as B-Talk and Insercom do allow a pacing delay of up to 100 ms between character transmissions.



Baud Rate Choice

Choosing a baud rate for serial communications is the first step in the process. Without pacing delays (see above), too high a baud rate will result in transmission errors (ex. >9600), which will corrupt the executive load. Too slow a baud rate (ex. <1200) will result in excessive download time and poor terminal response once the machine is ready to run. The type of executive, controller and memory configuration can also have an effect on the baud rate. The general rule is that older controllers should employ slower baud rates. For example, an 8221/v2 controller with 32k memory will not load at 9600 baud using PPU/UCT II but the same controller w/128k will load a UICS executive in most cases. We recommend using a baud rate of 1200 for executive loading where no pacing delay can be configured.

If you are having difficulty loading an executive, the problem can be one of three issues:

1. Communications

If the communications are not working between the PC and the controller, the executive can not load properly. Make sure the BAUD rate, data bits, stop bits and parity selection on the controller and the PC port match. Most systems are configured for 8 data, 1 stop, no parity. The BAUD Rate of 9600 works well but on newer PCs, this Baud rate can basically cause the controller com port to be overrun with characters. This occurs because the newer PCs are running so fast that the pacing no longer enough to allow the controller to receive and store the data. If you change the BAUD rate to a slower speed on both the controller and PC port settings, the controller can generally receive the exec error free. The PC and the controller offer no error checking or error correction in terms of packets or in the entirety so once the executive load process begins; it generally runs its course even when it is not working correctly.

2. Absolute Loader

Some executives have the absolute loader program embedded in them, others do not. All executive loading requires that the absolute loader arrives first in the controller. If you are unsure if your executive has the absolute loader, the PC can insert the loader ahead of the exec when loading is initiated.

In UCTII, press Ctrl F6 to access the executive loading command string.

```
77773000G<Ctrl-B><Ctrl-L>
```

3. Executive

The executive itself could be a source of trouble. For example, the Older Satellite executives were designed for 32K (64KB) memory systems. Newer UICS 1.0 Executives were also designed for the 32K memory Systems. UICS1.2 and greater require at least 128K (256KB) memory systems. Verify the executive file size in dos or windows to determine the bulk size of the file. If the file is greater than 64kb, it can not be loaded in a 32K controller. Note that controllers are sized in 16 bit or 2 byte words so a 32KW controller is 64KB but only 28KW or 56KB is available for the executive and pattern space, The upper 8KB is reserved for hardware I/O addressing.

Communications Established

After powering up the machine controller and halting it (make sure machine is stopped and palmed down!), an "at sign" "@" should appear on the console terminal (PC screen). If no at sign is received and displayed, try hitting the enter key a few times. Again, if nothing is displayed, try toggling the run/halt switch on the controller. Once @ character is received, you may now proceed to run some diagnostics.

ROM Diagnostics

Place controller in halt mode (EMI/PS run/halt switch in front of I/O box).

Power Up controller.

@ sign should appear on terminal

771000G Initiate memory map routine

0—157776 32K

0--377776 128K

0--757776 256K

771004G Initiate LTC test

after 60 P's print to screen

enter @R2/001700 (1700 value indicates a 1 ms clock)

Executive Loading

If basic diagnostics are successful, an executive load can be performed. Executives are loaded using a terminal emulation program (i.e. UCTII). There is no error checking except in protocols, if prompts do not appear after the load is complete, the load may not actually be working. Configuration of executive handling parameter may be needed. BAUD rates above 9600 are problematic unless some type of character pacing is employed (not in UCTII). Some programs such as Btalk have advanced features allowing higher transfer speeds.

Diagnostics After the Executive is loaded

Waiting for machine power on

Using odt to examine the status of these registers is my favorite way to verify the machine power on bits. This method displays the address contents in octal, you may also use the executive diagnostics to examine DSF15, it will give you the actual bit values.

To enter odt, you will need to halt the controller. Toggle the run/halt switch to put the controller in halt mode. The terminal should display an "@" symbol.

On the J11 controller

The object is to see if the MIT and local I/O on the J11 controller is actually present. Bit 15 is hardwired on both the local I/O of the J11 and on the remote MIT board, if the I/O has power- the bit is read as a 1, otherwise a zero (indicating machine power off)

In odt the machine address may be entered to examine DSF15

example machine 1 @17 766 000 DSF00

...
@17 766 036 DSF15

at the ODT promp "@" enter 17766036

the octal value after the "/" will denote the K5 bit switch settings

example: @17766036/100000 indicates machine 1 power on, no k5 jumpers in

^
machine power on bit

If this response is not found (bit 15 being the machine power on), make sure K7 has all jumpers installed. (important: bit 15 of this location is the machine power on status bit).

Now check the the remote I/O via the MIT board

ref: @17766400 DSF00 machine 9

...
@17766436 DSF15 machine 9

@17766436/1xxxxx the response should match the 7 and 8 position bit switches

^
machine power on bit

On older 8221 and 8222 controllers

You will need to halt your controller. Toggle the key switch (8221) or run/halt switch (8222) from run to halt, then halt back to run.

If the MIT or FIT address bit switches are all set to [000] (machine 1) entering "776036/" at the prompt will read the DSF15 and display the CIT/MIT configuration bit switches and the machine power on bit.

@776036/1xxxxx

the 1 denotes machine power on. All other digits are the bit switch setting on the CIT card.

You may also enter 776000/ then control-J to linefeed through all the card addresses until you see bits. The machines have 16 addresses each. If the FIT bits witches are wrong or defective, the machine may be at a different address.

or try typing in the addresses directly. Enter 776036/, 776076/, 776136/, 776176, 776236/, 776276/, 776336/, or 776376/ at the odt prompt to find it. These correspond to machine 1, 2, 3, 4, 5, 6, 7 and 8.

If you can not find the machine this way, suspect the interface card in the machine controller, the CIT/FIT cards or MIT card in the I/O box, 50 pin cables, connectors and terminators. If you do find the address with machine power on and it is not at 776036, the bit switches may be set incorrectly or the cards are defective. You may cycle the power to have the exec reboot at any time when in halt mode.

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