Auper Electronic Controls Inc

4FM flow monitor system

Installation and user guide

09

GENERAL INFORMATION

FCC INFORMATION

This device complies with Part 15 of FCC rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference and, (2) this device must accept any interference received including interference that may cause undesired operation.
Note: The user is cautioned that any changes or modifications not expressly approved by the party responsible for FCC compliance could void the user's authority to operate the equipment.

LIMITED ONE YEAR WARRANTY

Auper Electronic Controls Inc. warrants that this product is in good working condition, according to its specifications at the time of the shipment, for a period of one (1) year from the date of purchase. Should the product, in Auper Electronic Controls Inc opinion, malfunction within the warranty period, Auper Electronic Controls Inc. will repair or replace the product without charge. Any replaced parts become the property of Auper Electronic Controls Inc. This warranty does not apply to the software component of a product or a product which has been damaged due to an accident, misuse, abuse, improper installation, usage not in accordance with product specifications and instructions, natural or personal disaster or unauthorized alterations, repairs or modifications.
THIS WARRANTY IS LIMITED TO REPAIR OR REPLACEMENT (AT AUPER'S OPTION) ONLY AND DOES NOT INCLUDE ANY LABOR OR TRANSPORTATION CHARGES OR COMPLIANCE WITH ANY FEDERAL, STATE OR LOCAL LAWS, CODES OR REGULATION.
Notice of any claimed breach of said Warranty must be promptly given to the Auper authorized dealer from whom the product was purchased or leased. Upon request, al l systems or parts which are claimed to be defective must be made available for inspection by and/or return to (at AUPER'S option) such authorized dealer and/or Auper. No repair or replacement under said warranty will extend the original warranty period.
THIS WARRANTY IS EXCLUSIVE AND IS IN LIEU OF ALL OTHER WARRANTIES, ORAL OR WRITTEN, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR ANY PARTICULAR PURPOSE.

LIMITATIONS

All warranty for this product, expressed or implied, are limited to one year from the date of purchase and no warranty, expressed or implied, will apply after that period. No warranties for this product expressed or implied will apply to any person who purchases the product in used condition. The liability of Auper Electronic Controls Inc. with respect to any defective product will be limited to the repair or replacement of such product.
In no event shall Auper Electronic Controls Inc be responsible or liable for any damages arising
(a) from the use of the product;
(b) from the loss of use, revenue or profit of the product; or
(c) as a result of any event, circumstances, action or abuse beyond the control of Auper Electronic Controls Inc.; whether such damage be direct, indirect, consequential, special or otherwise and whether such damages are incurred by the person to whom this warranty extends or a third party.

DISCLAIMER OF OTHER WARRANTIES AND LIABILITIES

While all reasonable care has been taken in preparation of this product, it is provided “as is,” without warranty as to performance or fitness except as expressly stated above. The entire risk as to the quality of output developed with this product is assumed by the user.
Auper Electronic Controls Inc does not warrant that the software or system will meet any particular requirements of the user, other than as expressly stated above, and specifically denies any liability for incidental or consequential damages resulting from the use of this software or system. Auper Electronic Controls Inc also specifically denies all liability for any technical or editorial omissions in its product documentation, and for any incidental or consequential damages resulting from the furnishing, performance or use of its documentation.

INSTALLATION

PACKAGE

- 4FM control unit
- Two manager keys (N0 2007)
- 12 Volts AC transformer
- Flow meter junction box
- 25 ft (7.62 m) flow meter collector cable

OPTIONS

- RS-232 serial cable (serial printer, POS or computer)
- Serial printer
- Draft Manager software
- Dual counter firmware for self serve beer at the table application
- External reset key (different than system key) for self serve model

POSITIONING YOUR SYSTEM

The 4FM being a control system should be installed in such a way as to be tamper proof that you choose to install it at the bar or in your office. Cables and connections should be protected and secured out of reach. The **power source should not be installed where it can easily be disconnected**. Do not connect the 4FM power source to an electrical outlet that can be turned off at night.

FEATURES

The 4FM is equipped with a serial port which can be set to either Rs-232 or Rs-422. The serial port outlet is a RJ11 jack (phone jack). There is a dip switch on the circuit board to make the port type selection. The 4FM can be connected to a computer running the Auper Draft Manager software. The 4FM can be used as a standalone using the RS-232 or linked with other Auper metering systems using the RS-422 port.

The 4FM will also print a usage report on a serial printer.

The system is also equipped with a real-time interface. When turned on, the 4FM will send the amount served through the serial port, two seconds after the flow meter has stopped moving following a special communication protocol.

CONNECTING THE FLOW METERS

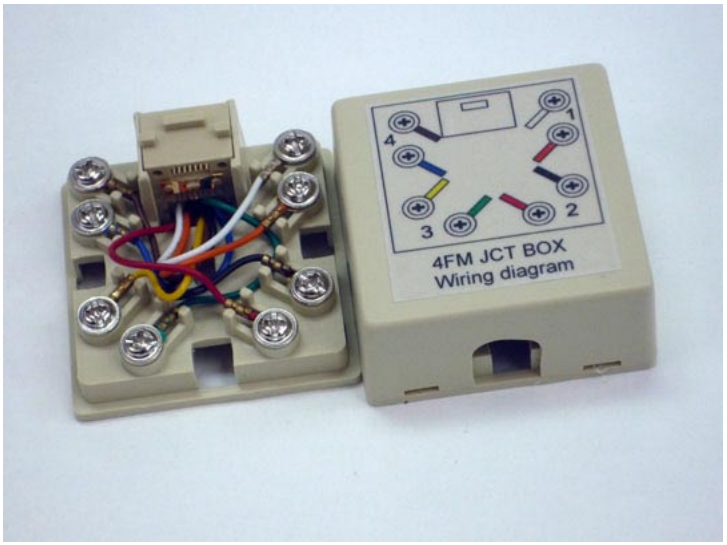
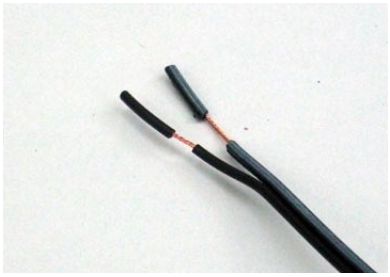


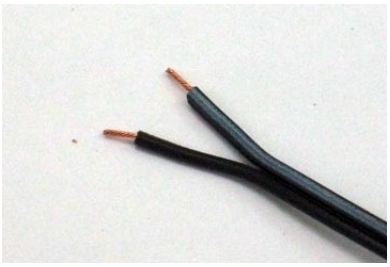
Figure 1 4FM junction box

Follow the instruction sheet supplied with the flow meters for complete step by step instructions. Since the flow meters are supplied with a 25 ft (7.6 M) cable, you should try to position your junction box to reach as many flow meters as possible. Flow meter cables can be extended 300 feet should you need to.

The junction box will connect to the 4FM using a regular Cat 5 network cable terminated with RJ45 connectors. Cables are available for up to 150 ft (46M). Longer cables can be made on demand and can reach 300 ft (100 M). This is the same kind of cables used for computer networks, so you can always find them in computer stores or have them installed by local computer network contractors.

Figure 2 RJ45 cable end





The ends of flow meter cables have been stripped at the factory. Pull the insulation off the wire and cut the copper wire to get ¼ in (6mm) exposed only.

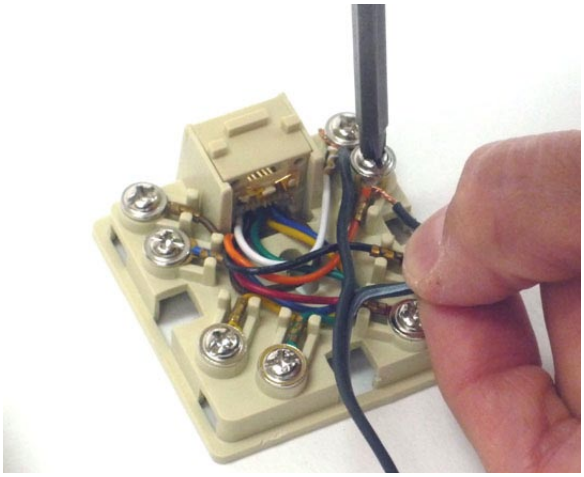
Inspect each wire after to verify that you have not cut the copper wire and that all the strands are intact.

Auper flow meters do not use an external power source. There is no voltage going to the flow meters so you cannot damage them even if you touch the wires. There is no positive or ground either. You do not have to worry about polarities.

Follow the connection diagram on the cover.
Connect flow meter No.1 to the top right screws (white/orange) and the other three will follow in a clockwise direction.

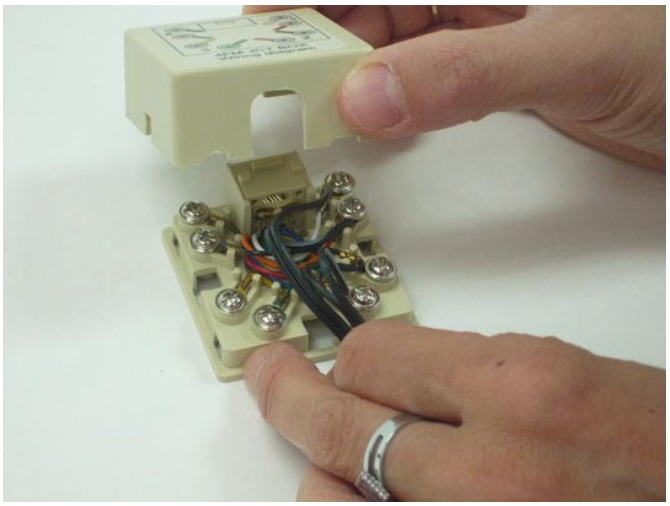
Tip:

The easy way to make a good connection is to bring your stripped flow meter cable from below the screw on the left side of the screw.
Slip your exposed wire under the screw and tigthen your screw. Make sure the whole wire is covered by the screw.



Inspect your connections before closing the cover to make sure that no wires are touching each other.

If two wires are touching, the flow meter signal will be shorted and will not reach the 4FM.



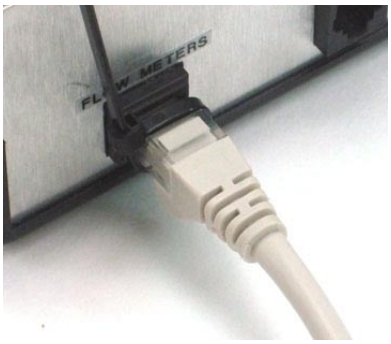
Connect the network cable to the junction box. Secure all your cables using cable ties. Several cable ties with loops are provided to secure your cables to the wall using screws. Loose wires should be avoided at all times.

Use one of the small cable ties provided with the junction box to secure the connector in place. Slip the cable tie between the connector's body and the tab. The cable tie will prevent the tab from being pushed thus preventing anyone from disconnecting the cable.

CONNECTING THE 4FM

Warning: Although this cable is the same as computer network cables, it is used to bring the flow meter signals to the 4FM. This is not a computer network device. DO NOT CONNECT THIS CABLE IN ANY HUB, ROUTER OR OTHER ETHERNET DEVICE OR JACK.

SECURING THE CONNECTOR



Use one of the small cable ties provided with the junction box to secure the connector in place. Slip the cable tie between the connector's body and the tab. The cable tie will prevent the tab from being pushed thus preventing anyone from disconnecting the cable.

REMINDER:

Securing the flow meter cables and junction box cables will effectively prevent people from tampering with the flow meter system. You should visually inspect the cables regularly.

POWER SUPPLY

Use a 12 Volts AC transformer at 20VA to power the 4FM.
Connect the 4FM power cord to the power supply. There are no polarities and you can extend the cord if you need to reach a secure power outlet.

Use a flat (or Phillips) screw driver to tighten the screws. It's a good idea to plug the power supply into a surge protector or UPS (Uninterrupted Power Supply) to insure stable power to the unit.

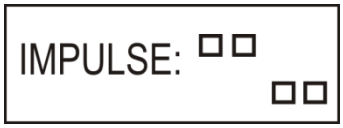
Connect the transformer to a power outlet. Avoid using inexpensive power bars as the transformer may fall and disconnect. Make sure the power source cannot be disconnected by the staff. A UPS (battery backup) is an added security since it will supply power to a 4FM for a long time in case of power failures insuring continuous power to the unit.

POWER UP AND SET UP

The first thing you do when you start a 4FM is verify the status of the flow meters.

Insert and turn the key to Clear/Prog

IMPULSE MODE



From left to right, 4 dots representing lines 1 to 4.

- When a flow meter is connected to a line, the corresponding dot is up.
- If no flow meter is connected to a line, the corresponding dot is down.
- When a flow meter detects liquid flowing through it, the corresponding dot will alternate up and down.
- If a flow meter is installed backward, the corresponding dot will be up but will not alternate when product is flowing.

Verify that your flow meters are connected and registering by serving a little bit at each faucet.

If you had not yet removed the air pocket from your beer lines, now is the time to do it. You cannot proceed with calibration until you do.

Press the M button once

UNIT SELECTION MODE

The 4FM can BE set to measure ounces, CL (centiliters) and units of 1.
To calibrate, you will serve a measured amount of liquid into a graduated cylinder. During the pouring, the system will read the number of rotations sent by the flow meter.
At this stage, you choose how you want the system to count and the amount you will serve into the graduated cylinder to calibrate.

Press the E button (Enter) to toggle between ounces, CL and units.
Press the L button to select the amount served to calibrate.
To calibrate for ounces, select 20 oz or more.
To calibrate for CL, select 60 CL or more.
The count units of 1, serve the unit you want to count.

Press the M button once every time you want to change mode.

As soon as you press the M button, you enter the calibration mode.
Make sure nobody will use the beer taps during that time other than to set the calibration values.

CALIBRATION MODE

As soon as you enter this mode, all four lines are in calibration mode.
Press the L button to change the line number displayed on screen.

C1 0289 → 00.0000

TIP: For draft beer, you can kill the foam by spraying WD40 into the graduated cylinder before serving.

You have to serve the amount selected on all lines equipped with flow meters (20 oz or 60 CL for example). If you miss and serve too much on one line, stop and proceed with serving the selected amount at the other beer taps.

Using the graduated cylinder serve exactly the amount set previously. You can stop to let the beer foam go down. The flow meter pulses will register on the left side of the display.

Press the E button to calibrate after you have poured the amount at each tap. The value on the right will change to the new calibration value. You can view the calibration values of each line by pressing the L button.
If you need to recalibrate one of the lines, simply serve the selected amount on this line only. As long as you do not touch the other taps, the registered pulses will remain “0000” and the system will not recalibrate.

CLR 1? 123456.78

CLEAR COUNTER MODE

You can clear a specific line counter in this mode.
Select the line number with the L button.
Press E to clear the counter.

CLEAR POWER FAIL COUNTER MODE

The PWF (Power Fail) counter counts the number of times the 4FM was disconnected. As a precautionary measure, you should read this counter every times you read the line counters.
Press the E button to clear the counter.

SYSTEM DISABLED MODE

You can use this mode if you use the 4FM counters to track your beer kegs inventory and that you do not want the counters to count during the regular beer line cleaning procedures.

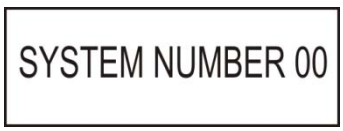
Simply leave the system on that mode and the counters are disabled.
Press the M button to change mode and reactivate the counters.

BAUD RATE MODE

The baud rate is used only when connecting the 4FM to a computer or a serial printer. The default baud rate of most computers and printers is 9600 bps.

Press the L button to toggle between 9600, 19.2 K and 2400.

SYSTEM NUMBER MODE



The system number is used to identify the 4FM on a printed report or by the computer if you use the Draft Manager software.

You can set the number between 00 and 99.

Press L to increase the system number.
Press E to decrease the system number.

INTERFACE MODE

The 4FM is equipped with a real time interface mode. This mode can be used if you have a real time beverage tracking software. The 4FM will send the new counters for the line(s) used, 2 seconds after the tap was closed. The data will be sent through the serial port following a special communication protocol. **TURN THE INTERFACE TO OFF IF YOU USE DRAFT MANAGER.**

Press the E button to turn the interface ON.
Press the L button to toggle between Async and Sync.
Please READ the interface documentation for details on the operation and selection between synchronous and asynchronous.

VERSION MODE

This mode identifies the firmware version number of your 4FM.

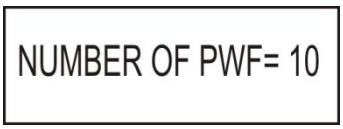
TURN THE KEY TO RUN WHEN FINISHED.

OPERATION

When the key is turned to the Run position, you are in the counting mode. The keys will be required to validate the manager's presence to change anything or clear the counters.

Press L to toggle between the line counters.
Press M to view the PWF counter.
Press M again to get to print a report. Press the E button to print.
Press M again to enter the Clear All Line mode. Turn the key to CLEAR and then immediately back to RUN.

You are back to the counting mode.



CONTROLLING DRAFT BEER

Introduction

The 4FM is a flow monitoring system that uses accurate flow meters for the measurements. It registers the amount of beer served with a very high degree of precision. You can use the information provided by the 4FM to effectively control your draft beer sales by comparing the sales reported on your POS or cash register with the corresponding beer counters.

When you calibrated your 4FM, you used a graduated cylinder and served a measured amount of liquid. The system compared the flow meter pulses received and calculated a calibration value to insure the highest degree of accuracy possible. We can never over estimate the importance of the accuracy of your measurements as they represent a lot of money at the end of each year. Keep this graduated cylinder in your office as you will need it in the future to verify your measurements and glass sizes. You can always use the graduated cylinder to check everything, including the accuracy of your flow meter system. It will provide you with the peace of mind you seek about your metering system and your draft beer management.

FACTS ON BEER AND FLOW METERS

1. When you open a beer tap, the beer flows out at approximately 2 oz per second. It takes roughly 5 seconds to fill a 12-oz glass.

2. A glass size cannot be estimated. There is always some foam on top so you have to measure it. Use the graduated cylinder and compare with your 4FM readings.

3. Since not all glasses will be served equal in your bar, you need to measure several of them in order to average the quantity of beer you should expect to be served per glass size.

4. It is a good practice to visually inspect the glasses in your bar regularly. When in doubt, take your cylinder out and measure the glass size.

5. Once you know how much beer you can expect to be served in each glass size, you can calculate your average pour cost per glass. You can also estimate what is an acceptable discrepancy with the sales registered. It is not a perfect world and things do happen in a bar. You need to establish your tolerance to these “things”.

6. To calculate the pour cost per glass size and brand, divide the cost per keg by its content in ounces. Multiply by the expect amount served per glass. Ex: $ 100 / 2064 OZ = 4.85 CENTS/ OZ x 10.5 oz per glass = 50.5 cents per glass.

7. With the expected amount of beer per glass size, you can easily check if the sales registered match the amount of beer actually served during the same time.

8. The measurements provided by the flow meter system can also be used to evaluate how bartenders work, can help you raise their awareness to the cost of beer and help train them in serving beer more efficiently.

THE VALUE OF ACCURATE MEASUREMENTS

If you browse the Internet, you will find some control systems vendors out there say that the average "national" loss for draft beer is approximately 15 %. Where does this value come from? Who knows, but it could very well be an estimation designed to raise the manager's awareness to the value of the lost beer. If you are reading this, you probably made that leap anyway.

Anyway, to repeat what you will find on many web sites, let's say you purchased 500 kegs (10 kegs per week) of beer last year. If each keg contained 2000 oz, you would have purchased a total of 1 million ounces in the year.
3% of a million is 30,000 ounces. It is also the equivalent of 3000 10-oz glasses or 15 kegs. It adds up fast.

THE CAUSES FOR LOST BEER

1. Foam and waste
2. Over pouring and carelessness
3. Unregistered sales and register errors

FOAM AND WASTE CAN BE CAUSED BY:

1.1. Wrong choice of gas and/or gas pressure related problems
1.2. Refrigeration problems or inadequate refrigeration power
1.3. Badly designed beer distribution system and/or insulation related problems

OVER POURING AND CARELESSNESS

Are your bartenders opening the beer tap for a second or two before putting the glass under?

Do they fill the glass and then tilt it in the drip tray to get rid of some foam to make space for more beer?

If yes it may mean one of two things: Your beer comes out foamy at first because it's warm in the tower or, the beer line runs out of pressure and your beer becomes foamy after a few seconds. At 2 oz per second, your waste adds up quite fast and you will reach the 15 % national average in no time at all.

Do you waste beer every time you change a keg?

FOB's will prevent that from happening. The FOB's are installed at the source, between the keg and the beer lines. When gas rushes into the FOB instead of beer, a float will shut off the beer line preventing gas from pushing the beer out all the way to the faucet. The line will stay primed with beer ready for a new keg. You will save beer and a lot of serving time and aggravation every time you have to change a keg.

If you have foaming problems, it is a good idea to have your system looked at by a professional. It is an investment that will help increase your profitability.

CONTROLING DRAFT BEER SALES

You are now in the driving seat because you will know exactly how much beer will be dispensed each day during your staff's shifts. The key to successful draft beer management is awareness and accountability. You don't want to fight with your staff; you want them to work with you. Proper pouring techniques, a good beer system and a clear game plan will motivate them and you will benefit greatly from it.

SALES REPORT

In order to reconcile your beer sales, you need a beer sale report listing the beers sold by brand and glass size. If you can set it to make it easy to print such a report at the end of each shift the better.

THE DAILY DRAFT BEER WORKSHEET

The worksheet can be filled by your staff at the end of their shift or you can have someone in management take the numbers and do it using an Excel spreadsheet the morning after. Either way will work.

You can simplify the worksheet a little if you choose to clear the counters at the end of each shift. It will save you from calculating the amounts recorded by the flow meters. On the other hand, keeping track of the totals can help you anticipate when you will have to change a keg. You will find an example of a worksheet at the end of this chapter.

DRAFT BEER LINE CLEANING

Your beer lines are cleaned regularly, each month or so. When the technician comes in to do the work, the bar is not usually open for business. You should record the meters before and after the line cleaning. It is a good idea to keep track of the line cleaning intervals. Dirty beer lines may affect the taste and smell of your beer and that may in turn have an effect on your beer sales.

Some people who keep track of their pour cost more seriously will be interested in finding out how much beer is wasted each time the lines are cleaned. You only need to do this once unless you change the beer lines.

MEASURING THE WASTED BEER WHEN CLEANING LINES

The flow meter is located at the back. The beer contained in the tubing has already gone through it. Write down the meters just before the technician starts the line cleaning. Let him connect his cleaning tank and go with him when he opens the faucet. The pressured cleaning cylinder will push the beer out to replace it with the cleaning solution. As soon as you see the beer change to line cleaning solution, close the tap. Read the meters again. You have your wasted beer including the content of the FOB.
When the line cleaning is finished, he will push the water out with beer to fill the line again. You may add an extra 20 oz of waste or so to account for what gets dumped down the drain during the transaction from water to beer.

DRAFT BEER DAILY WORKSHEET

DATE: 05/05/2009 TIME: 11 AM - 3 pm

YYYY/MM/DD

NAME: NANCY

LINE NO	BRANDS/METERS	METERS IN	METERS OUT	SERVED
LINE 1	BRAND 1	2000	2564	564
LINE 2	BRAND 2	6500	6823	323
LINE 3	BRAND 3	5550	5703	153
LINE 4	BRAND 4	3369	4682	1313

	BRAND 1/SOLD	SIZE 1	SIZE 2	SIZE 3	Total	Served	Var
LINE 1	SALES	10	13	5			
	WASTE	0	0	0			
	X QTY PER SIZE	***10.25***	***14***	***55***			
	Total	102.5	182	275	559.5	564	4.5

	BRAND 2/SOLD	SIZE 1	SIZE 2	SIZE 3	Total	Served	Var
LINE 2	SALES	9	9	2			
	WASTE	0	0	0			
	X QTY PER SIZE	***10.25***	***14***	***55***			
	Total	92.25	126	110	328.25	323	-5.25

	BRAND 3/SOLD	SIZE 1	SIZE 2	SIZE 3	Total	Served	Var
LINE 3	SALES	0	3	2			
	WASTE	0	0	0			
		10.25	***14***	***55***			
	Total	0	42	110	152	153	1

	BRAND 4/SOLD	SIZE 1	SIZE 2	SIZE 3	Total	Served	Var
LINE 4	SALES	39	28	9			
	WASTE	0	1	0			
	X QTY PER SIZE	***10.25***	***14***	***55***			
	Total	399.75	406	495	1300.75	1313	12.25

COMMENTS:

Customer returned a glass of brand 4 because the rim was chipped.
The beer was foamy on line 4 early in the shift. Did the best I can!!!!

THE 4FM SERIAL PORT

The 4FM is equipped with a serial port that can be set to either Rs-232 or RS-422.

RS-232

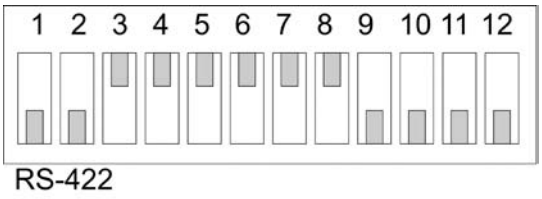
Use the RS-232 port to connect **one system only** either to a printer, a cash register, a POS or a computer, for distances up to 100 feet (30 meters).

RS-422

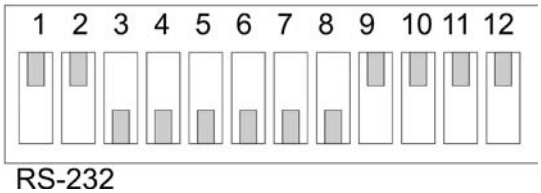
- Use the RS-422 port to connect the system to any peripheral that is at a distance further than 100 ft (30 meters) and for distances of up to 3330 feet (1000 meters).
- Use the RS-422 port to connect more than one system to the same peripheral (PC, POS or printer) using either the AP421 converter or the AP821 RS-422 hub.

CHANGING THE SERIAL PORT SETTING

Open the 4FM cover and locate the dip switch on the circuit. Position the switches as per the illustration below.



RS-422



RS-232

CONNECTING THE 4FM TO A SERIAL PRINTER

To connect a serial printer to the 4FM, use the RS-232 port. If there is a 9-pin female serial cable supplied with the printer it is NOT compatible.
Use cable P/N: 70-102 modular jack to 25 pin male for your printer.

PRINTER SETTINGS

4FM printer cable

- Baud rate: 9600
- Parity: none
- Stop bit: 1
- Handshaking: Xon/Xoff
- Print columns: 40

CONNECTING THE 4FM TO A COMPUTER

You can connect your 4FM to your PC to use the Draft Manager software or to use the interface (cable and software purchased separately). Order the RS-232 serial cable part No 70-100 (RJ11 to 9-pin adapter). The RS-232 cable cannot exceed 100 ft (30 meters).

USB TO SERIAL CONVERTER

USB to serial converter

Newer computers may not be equipped with 9-pin serial ports. A USB to serial adapter will solve the problem. Drivers are provided with the converter and must be installed on the computer. Windows will assign the serial port automatically. You can find to which port your converter has been assigned at:
Control panel/system/device manager/ports (Com & LPT)

Use the default Windows serial port settings are:
9600 bps, 8 bits, no parity, 2 stop bits and no flux control.
If you have a communication problem, change the stop bit to 1.

RS-422 SERIAL PORT CONNECTIONS

You will use the RS-422 port for the following reasons:

- You wish to connect your 4FM to a computer more than 100 ft (30M) away.
- You have more than one Auper beverage control system that you want to connect to the same computer, POS or printer.

AP421 RS-232 converter

RS-422 TO RS-232 CONVERSION

When using the RS-422 port, you will need to convert the signal back to RS-232 before you can connect your cable to a computer, POS or printer. The AP421 converter will accommodate up to four RS-422 inputs to convert to a single RS-232 port.

SHORT DISTANCE RS-422 CABLE INSTALLATION

RS422 modular cable

Short distance RS-422 connections (usually less than 50 ft/ 15M) will be done using modular cables only. The cables will connect directly from the system(s) into the converter. You will connect the converter to the peripeheral (printers, cash registers and POS) using a RS-232 null modem cable. (Order the cables separately P/N 70-041-X)

LONG DISTANCE RS-422 CABLE INSTALLATION

RJ45 jack

We recommend using standard **Cat5e network cable** to do your long distance RS-422 connections. Network cables are terminated with a RJ45 connector at each end. The RS-422 modular cables fit directly in the middle of the RJ-45 wall plate or coupler. You will need two modular cables for each Cat5e cable (one at each end).

THIRD PARTY CAT5E INSTALLATION

Many companies specialize in passing and terminating network cables. They will test their cables and provide you with a warranty. Have them terminate the cables with RJ45 wall plates as they normally do for computer networks.

RJ45 wall plate

DO IT YOURSELF CAT5E INSTALLATION

You may not be equipped to terminate Cat5 cables and test them adequately. Cat5e patch cables are available in lengths of up to 150 ft (50 M). These are available from Auper or from any computer store. Simply install a RJ45 female coupler at each end to have a tested Cat5e cable ready to accept our RS-422 modular cable.

WARNING: DO NOT USE CROSS OVER CAT5 CABLES

RJ45 female coupler

SINGLE SYSTEM RS-422 INSTALLATION

You will use the AP421 to convert the RS-422 signal coming from your system to RS-232 that is compatible with your computer. You will connect the converter to the computer using a RS-232 null modem cable.

MULTIPLE SYSTEMS RS-422 INSTALLATION

You will use the AP421 converter to connect from 1 to 4 systems to the same serial port. The AP421 has a RS-232 port ready to connect to any serial peripheral. The AP421 and cables must be ordered separately.

NOTES: