Installation KI-1856C

Rauland RANGER® Head End

Rauland-Borg Corporation
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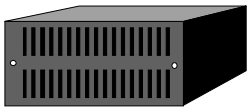
Rauland RANGER® Headend Cable Summary *55*

1

Installation

RANCAGE Fiber, Multiplexer, and Demultiplexer Card Cage



The RANCAGE is a card cage that houses Fiber, Multiplexer, and Demultiplexer cards used with a RANGER system (RANAVMS2, RANAVDS2, RANFT4, or RANFR4). This cage holds any combination of ten cards regardless of the type of card. The RANCAGE requires 12 VDC at 20 mA and mounts in a four-rack unit (7") space.

Parts Required

4 Mounting screws (RB Part # B0439) and 4 washers (RB Part # WL0315) (supplied with the RANCAGE)

1 Pair of twisted 18-gage wires (red and black) for power

Associated Equipment

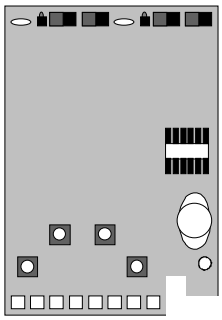
1 12 VDC power source (e.g., RANPS12)

RANAVMS2, RANFT4, RANFR4, RANAVDS2

Installation

1. Mount the RANCAGE into the rack.
2. Connect the 18-gage red wire to the positive terminal of the power supply (e.g., RANPS12) and the black wire to the negative terminal.
3. Connect the other end of the 18-gage wires to the two-pin terminal strip on the back of the RANGAGE. Be sure to connect the red wire to the positive side of the two-pin plug and the black wire to the negative side (see the silk screening on the back of the unit for the proper locations).
4. Install the necessary cards for your resources and follow the appropriate installation instructions (see “RANAVMS2,” “RANFR4,” and “RANFT4” for more information regarding their specific requirements).

RANAVMS2 Stereo Audio/Video Multiplexer Module



The RANAVMS2 is a stereo audio/video multiplexer module that combines a media resources' audio and video signals onto one 75 Ω coax cable. This cable then connects to the video matrix switch, which then passes the signal over another 75 Ω coax cable to the classroom. The RANAVMS2 consists of two multiplexer modules on one PC board allowing two resources to be connected to one RANAVMS2. These stereo audio/video multiplexer modules are housed in a RANCAGE card cage with a 12 VDC at 400 mA power source.

Parts Required

1 75 Ω video cable with Phono-to-Phono connectors (refer to drawing VW2377) or Phono-to-BNC (refer to drawing VW2376) for RANVFLOP and RANSVHS

2 Phono-to-Phono audio cable (refer to drawing VW2385). Separate left and right leads for stereo sources. Mono audio sources will only need one cable.

1 75 Ω video cable with Phono-to-BNC connectors for composite out to the video matrix switch input (refer to drawing VW2376)

Associated Equipment

1 RANCAGE Card Cage (see “RANCAGE” for more information)

1 RANPS12 Power Supply

1 Media device (e.g., RANVCR, RANCDI, RANLASER, RANVFLOP, or RANMENU)

Installation

1. Remove the front cover panel of the RANCAGE card cage.
2. Insert the RANAVMS2 into the front of the card cage along the card guides (located on the top and bottom of the card cage) until it snaps into place.
3. Place the resource (e.g., a VCR Player) onto its appropriate rack shelf. Now place the device and shelf into the rack.
4. Route a video cable from the media device's “Video Out” jack to the “Video In” jack on the RANAVMS2 module that you have designated for this device.
5. If this device has audio, route the audio cables from the media device's *Left* and *Right* “Audio Out” jack to the corresponding “Audio In” jacks on the RANAVMS2 module that you have designated for this device. This must be the same module that you have chosen for the video feed from that device. If it is a mono unit, select the *Right* audio input on the RANAVMS2.
6. Set the *Stereo/Mono* switch on the RANAVMS2 to the appropriate setting for the device. For devices without audio, select “Mono.”
7. Set the *Audio Impedance* switch to the appropriate settings for the device that you are using. Most devices use the 600 Ω setting. Use the 10kΩ setting for devices whose

audio output needs to be boosted (e.g., the Pioneer Laser Disc players—RANLASER). For devices without audio, select "600 Ω."

8. Route a cable from "Composite Video Out" (located on the back of the board) on the RANAVMS2 to an input jack on the video matrix switch. Note the input number that you have chosen.

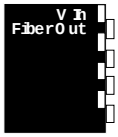
Adjusting the RANAVMS2

Once the system is operational and classrooms are on-line, it is important to adjust the RANAVMS2 multiplexer so that all of a system's media resources play at the same relative volume. We suggest using the operator console as your output source, because it is likely to be adjacent to the multiplexer module that you are adjusting.

To adjust the RANAVMS2:

1. Turn on the media device and load it with the appropriate media. Start the unit and locate a loud passage.
2. Adjust the *Audio Level* on the multiplexer module so that the "Overload" LED only comes on at very infrequent loud passages. If there is no audio source, turn this control completely counterclockwise.

RANFT4/RANFT4FM or RANFT1/RANFT1FM Fiber Transmitter Cards and Modules



These transmitter cards convert a coax signal to fiber. The RANFT4 is an AM Quad Fiber Transmitter Card that transfers a baseband audio/video signal from the video switcher over a multimode fiber-optic cable to a classroom (the RANFT1 is a single module). In fiber-optic based systems one RANFT4 is required for every four outputs (classrooms). While these modules are not required for baseband coax systems, it is possible to have some outputs that are fiber optic and some that are coaxial. The RANFT4FM and RANFT1FM are FM versions of the RANFT4 and RANFT1. Each transmitter mounts in the RANCAGE Card Cage, and requires 12 VDC at 280 mA.

Parts Required

1 RANCAGE Card Cage (to mount the RANFT4 or RANFT4FM)

1 RANFBINT TV Interface Box (to mount the RANFR1 or RANFR1FM)

Associated Equipment

1 Multimode Fiber-Optic cable

1 BNC-to-BNC 75Ω video cable (refer to drawing VW2375) for each of the four channels of the RANFT4

Installation

1. If it is not already off, remove the front cover of the RANCAGE card cage.

2. Insert the RANFT4 or RANFT4FM into the front of the card cage using the two metal card guides (located on the top and bottom of the card cage) until it snaps into place.

3. Connect a BNC-to-BNC 75 Ω video cable (see drawing VW2375) from the BNC jack on the RANFT4 or RANFT4FM to one of the output jacks of the RAN[*xx*]VS[*yy*] Video Matrix Switch.

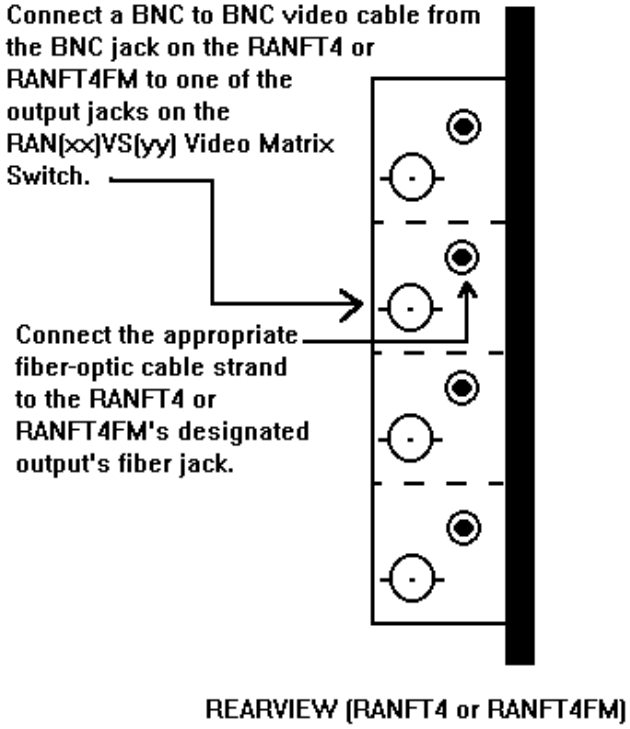
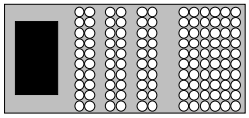


Figure 1. Wiring for Fiber Transmitters.

1. Connect the appropriate multimode fiber-optic cable strand to the RANFT4 or RANFT4FM's designated output's fiber jack. The eventual destination of this strand will be the Optical Input jack on the RANFR1 or RANFR1FM (as shown in the figure above). Note that all connectors for the fiber-optic cables must be the ST type.

RAN[*xx*]VS[*yy*] Video Matrix Switchers (Utah or AutoPatch)



Note: *The RAN[xx]VS[yy] is a modular unit. The xx and yy are variables that refer to the capacity of the switch: xx=inputs and yy=outputs.*

RAN[*xx*]VS[*yy*] and AutoPatch Switchers are video matrix switches designed to connect system inputs (typically media devices or locally originated broadcasts) to output locations (typically classrooms) in baseband RANGER systems. Switchers are also used in mixed baseband/broadband systems as inputs to modulators. Connections between classrooms and the media center are controlled through the RANCPU Control System Master Card, which interfaces to the Video Matrix Switch via an RAN232 connection. The switch then connects to the source device or other audio/video inputs through a multiplexer module (RANAVMS2) permitting the use of a video-only switch. The RAN[xx]VS[yy] is available in increments of ten inputs and ten outputs. The AutoPatch Switcher is available in increments of four inputs and four outputs. If the system is a switched broadband system, specify that the audio option be included, and do not use the RANAVMS2 or the RANAVDS2.

Parts Required

1 Interface cable (refer to drawing VW2374 for the RAN[xx]VS[yy] switch and VW2395 for the Autopatch switch)

1 Power cord (supplied with the switch)

1 RAN232 Serial Control Card (see "RAN232" for more information)

Associated Equipment

1 RANCC16 Control Card Cage (see "RANCC16" for more information)

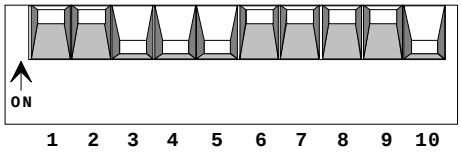
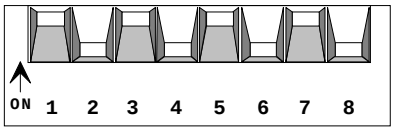
8 Mounting screws (RB Part # B0439) and 8 washers (RB Part # WL0315) for RAN[*xx*]VS[*yy*]

Installation

1. Typically the RAN[*xx*]VS[*yy*] itself will not be set up in the field and the steps detailed here will not need to be carried out by field personnel. These instructions are provided for reference purposes.
2. If it is not already mounted, mount the RAN[*xx*]VS[*yy*] into the rack.
3. Remove the control card by using the upper and lower plastic tabs. The card will have two sets of DIP switches labeled "Baud Rate" and "Stat/Bus." Using the following illustration, set the DIP switches for Utah Scientific switchers accordingly. The settings provided are for systems that have only one switch frame. The correct Utah Scientific serial port settings are 9600 baud, even parity, 2 stop bits, 7 data bits. If you are adding additional frames, you must adjust the settings. Contact Rauland-Borg for more information. AutoPatch switchers do not have a setting like this. The default serial port settings, which are made in the software, are 9600 baud, no parity, 1 stop bit, and 8 data bits.

Warning: *Before handling the control card, discharge static electricity from your clothes or body by touching a metal surface or using a grounding strap.*

Table 1. RAN[xx]VS[yy] DIP Switch Settings

Stat/Bus	
Baud Rate	

4. Once the DIP switches have been set, reinsert the control card into the slot from which you pulled it.

Configuring/Wiring the RAN[*xx*]VS[*yy*]'s RAN232

1. If you have not already done so, mount the RANCC16 into the rack.
2. If it is not already off, remove the front panel of the RANCC16 by loosening the four small thumbscrews.
3. Set the DIP switches on the RAN232 card to the settings detailed in the following illustration.

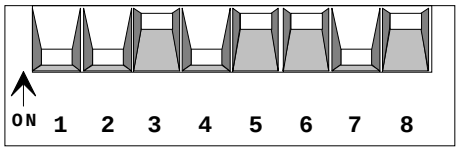


Figure 2. Utah Switch Setting for RAN232 DIP Switch.

4. Slide the RAN232 card into the first RANCC16's *slot 5* between the upper and lower white guides until it snaps into place.
5. Connect the Video Matrix Switches' interface cable (VW2295) from the RS232 terminal on the back side of the RAN[*xx*]VS[*yy*] to the back side of the RAN232 card in *slot 5* of the first RANCC16. Place the connector over the top eight pins on the back of the unit.

Note: *In order for the system to operate correctly, there must be a RAN232 card in slot 5.*

Configuring/Wiring the Autopatch's RAN232

1. If you have not already done so, mount the RANCC16 into the rack.
2. If it is not already off, remove the front panel of the RANCC16 by loosening the four small thumbscrews.
3. Set the DIP switches on the RAN232 card to the settings detailed in the following illustration.

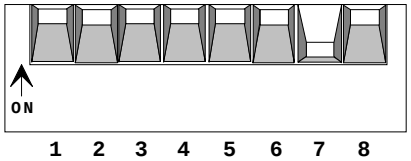
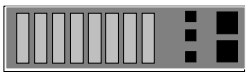


Figure 3. AutoPatch RAN232 DIP Switch Setting.

4. Slide the RAN232 card into the first RANCC16's *slot 5* between the upper and lower white guides until it snaps into place.
5. Connect the Video Matrix Switches' interface cable (VW2395) from the "In" terminal on the back side of the AutoPatch to the back side of the RAN232 card in *slot 5* of the first RANCC16. Place the connector over the top eight pins on the back of the unit.

Note: *In order for the system to operate correctly, there must be a RAN232 card in slot 5.*

RANCC16 Control Card Cage



The RANCC16 Control Card Cage provides rack-mounted housing for up to sixteen control cards (RANIR, RANRELAY8, RANDTMF, and RAN232). These cards each control one media device. Additionally, the RANGER system requires one RAN232 card for communications with the Media Center computer. This RAN232 card must be placed in slot 16 of the first RANCC16. These units may be daisy-chained with additional Control Card Cages for system expansion. The Card Server card provided with the RANCC16 requires 12 VDC at 120 mA. The RANCC16 takes up two-rack spaces (3.5").

Parts Required

1 Card Server Board (supplied with RANCC16)

1 18-gage pair of wires (red and black) for the power supply connections

4 Mounting screws and washers (supplied with RANCC16) or four mounting screws (RB Part # B0439) and four washers (RB Part # WL0315)

Associated Equipment

1 12 VDC power source (e.g., RANPS12)

RANCPU, RANIR, RANRELAY8 or RANRELAY14, RAN232, and RANDTMF

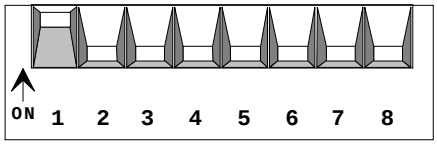
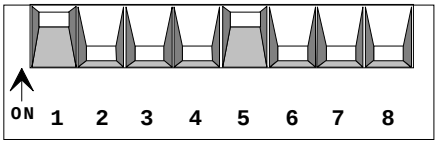
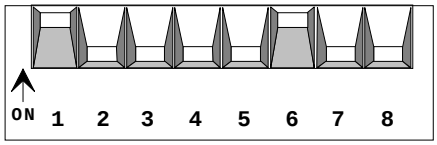
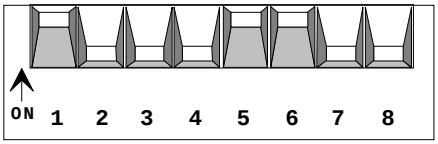
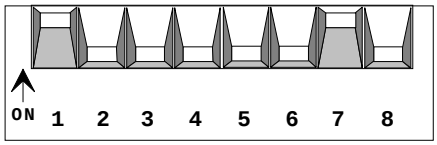
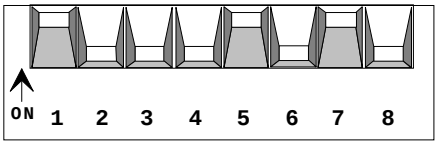
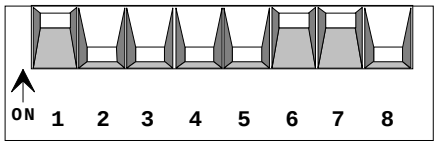
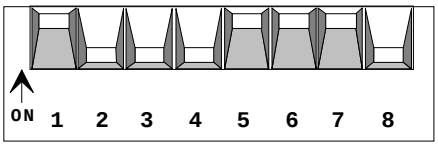
Installation

Setting the Card Server Card(s) (CS)

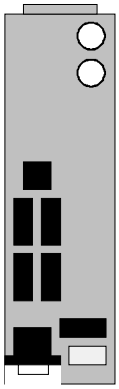
Note: Discharge static electricity from your clothes or body before handling the RANCPU card. Touch a metal surface to ground yourself or use a grounding strap.

1. If you have not already done so, mount the RANCC16(s) into the rack.
2. If it is not already off, remove the front panel of the RANCC16 by loosening the four small thumbscrews.
3. If you have not already done so, remove the CS card(s) from the RANCC16(s).
4. If your system has multiple RANCC16s, set the DIP switches on the CS card(s) to the settings detailed in Table 2 (or verify that the current settings match). As systems can have multiple RANCC16s to support additional controllable resources (beyond 16), it is critical that each card cage have a unique set of addressable slots. These should start at 1 and continue sequentially. The table that follows shows how to set up the server cards to address RAN232, RANDTMF, RANRELAY8 or RANIR cards with addresses above 16.
5. Slide the CS card between the upper and lower white guides on the RANCC16 slot labeled "CS" until it snaps into place.
6. Now you can load other control cards (RANIR, RAN232, RANDTMF and RANRELAY8).
7. Secure the front panel of the unit.
8. Connect the 18-gage red wire to the power supply's (e.g., RANPS12) positive terminal and the black wire to the negative terminal.
9. Connect the other ends of the 18-gage wires to the RANCC16's "Pwr 12 VDC Nom" connector (two-pin plug or two-screw terminal strip) located on the unit's back. Be sure to connect the red wire to the positive side of the connector and the black wire to the negative side (see the silk screening on the back of the unit for proper locations).
10. If there is more than one RANCC16, you may daisy-chain the power leads as well as the AxLink "GND," "AXP," and "AXM" connections.

Table 2. S1 on RANCC16's Card Server Card

RANCC16	Available Slot Addresses	CS Card #	DIP Switch Settings
1 (first one in chain. This is the default setting.)	1 to 16	1	
2	17 to 32	2	
3	33 to 48	3	
4	49 to 64	4	
5	65 to 80	5	
6	81 to 96	6	
7	97 to 112	7	
8	113 to 128	8	

RANCPU Control System Master Card



The RANCPU decodes all messages from classroom control panels (RANCLASS1 or RANCL201CP) or remote control units (RANHHELD). Unless a RANEXP or is used, each system must include one RANCPU or RANBROAD. This control-system master card mounts in the RANCC16 Control Card Cage and can handle control-link cable runs with up to 60,000 pF of capacitance. See Table 3 to determine the requirements for your system. If the capacitance per foot of the cable that you are using exceeds the maximum cumulative distance indicated in the chart, you will have to use a RANEXP or RANBROAD in place of, or in addition to, the RANCPU (see "RANEXP" or "RANBROAD" for more information). The RANCPU is typically connected directly to the RANPCSW computer for programming purposes via the VW2302 cable (supplied with the RANPCSW).

Table 3. Maximum Cable Distances for Use with the RANCPU

Cable	Capacitance per Foot	Maximum Cumulative Distance (in Feet)
WP D291	26	2,300
WP 291	45	1,200
WP D2401	14.5	4,000
WP D252401 (Plenum)	14.5	4,000
Belden 8102	12.5	4,500

Parts Required

1 In order to use RANGER software V3.30 or later, the RANCPU should have a label that indicates it is an "AXC-EM ENHANCED MASTER" and must have 256 kilobytes of RAM.)

Associated Equipment

1 RANCC16 Control Card Cage

1 RANPCSW Media Center Computer

1 CS Card (a Card Server is supplied with every RANCC16)

Installation

Note: *Discharge static electricity from your clothes or body before handling the RANCPU card. Touch a metal surface to ground yourself or use a grounding strap.*

1. If you have not already done so, mount the RANCC16(s) into the rack.
2. If it is not already off, remove the front panel of the RANCC16 by loosening the four small thumbscrews.
3. If you have not already done so, remove the CS card(s) from the RANCC16(s).
4. If your system has multiple RANCC16s, set the DIP switches on the CS card(s) to the settings detailed in Table 2 (or verify that the current settings match). As systems can have multiple RANCC16s to support additional controllable resources (beyond 16), it is critical that each card cage have a unique set of addressable slots. The table that follows shows how to set up the server cards to address RAN232 or RANIR cards with addresses above 16.

Setting the RANCPU's DIP Switches

1. If you have not already done so, remove the RANCPU from the RANCC16. You will find the card in the slot labeled "MC1."
2. The following illustration shows how to set the RANCPU's DIP switch settings to 38,400 baud, no parity, 1 stop bit, 8 data bits.

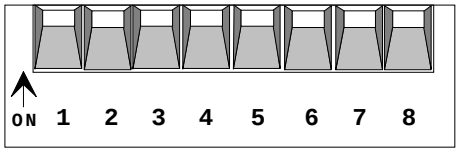


Figure 4. S1 DIP Switch Settings.

3. Slide the RANCPU card between the upper and lower white guides on the RANCC16 slot labeled "MC1" until it snaps into place.
4. Secure the front panel of the unit.

RANEXP Master Port Expander, RANBROAD Expander

The RANEXP is a Master Port Expander that is used in place of a RANCPU Control System Master Card when the total capacitance of the RANGER system's control cable run exceeds the RANCPU's limit (+60,000 pF). Each RANEXP accommodates 11 runs of cable with a maximum of 60,000 pF. It requires 12 VDC at 200 mA and is mounted in a single rack space (1.75"). The RANEXP will not be manufactured after 1996; its replacement is the functionally equivalent RANBROAD (see the following section). The RANEXP (or RANBROAD) is typically connected directly to the RANPCSW computer for programming purposes by the VW2302 RS232 cable (supplied with the RANPCSW).

Parts Required

12 Four-pin Phoenix connector (supplied with the RANEXP)

1 Two-pin Phoenix connector (supplied with the RANEXP)

4 Mounting screws and washers (supplied with the RANEXP) or four mounting screws (RB Part # B0439) and four washers (RB Part # WL0315)

1 One-pair shielded cable for connecting AMX Control Link West Penn D291 or equivalent)

1 18-gage power wires (black and red)

1 Serial interface cable (supplied with the RANPCSW or refer to drawing VW2379)

Associated Equipment

1 Six-terminal punch block (Graybar part # S66B3-75)

1 12 VDC power source (e.g., RANPS12)

1 RANCC16 Control Card Cage

Estimating the Number of RANEXP or RANBROAD Ports

In order for the RANGER system to operate correctly with your RANEXP or RANBROAD, it is imperative that you not exceed the distances specified for the cable that you are using (as detailed in the following table).

1. Locate the type of cable you are using in Table 4.

Table 4. Maximum Cable Distances for Use with the RANEXP or RANBROAD

Type of Cable	Maximum Cumulative Distance per RANEXP	Maximum Cumulative Distance per RANBROAD	Maximum Distance per AXLINK port on the RANEXP or RANBROAD
WP D291	25,300	23,000	2,300
WP 291	13,200	12,000	1,200
WP D2401	44,000	40,000	4,000
WP D252401 (Plenum)	44,000	40,000	4,000
Belden 8102	59,500	45,000	4,500

1. Add up all the cable distances per classroom to calculate the total distance. See the second column in the example that follows.
2. Locate the cable that your are using in Table 5. Divide the "Total cable distance" that you calculated in the previous step by the "Maximum Distance per AXLINK Port on the RANEXP or RANBROAD."
3. The number that you arrive at will determine the number of RANEXP or RANBROAD AXLINK ports needed (see the last column in the table below). If the number you arrive at is larger than 12 for the RANEXP or 10 for the RANBROAD, you will need to add an RANEXPAD or another RANBROAD.

Table 5. RANEXP or RANBROAD Port Estimation Example

Type of Cable	Total Cable Distance	Max. Distance per AXLINK Port on the RANEXP or RANBROAD	Number of RANEXP or RANBROAD AXLINK Ports
WP D291	4,870	2,300	3
WP 291	3,807	1,200	4
WP D2401	8,899	4,000	3
WP D252401 (Plenum)	7,065	4,000	2
Belden 8102	8,038	4,500	2

The number of punch blocks (S66B3-75) you need depends on the length of your cable runs and the way you configure the RANEXP or RANBROAD ports.

Installation

Note: RANEXP's are a functional replacement for the RANCPU. If you have a RANEXP you do not need a RANCPU. Do all the normal setup steps for a RANEXP.

1. Locate the DIP switches on the front of the RANEXP and set them to 38,400 baud- all switches set to the "off" position (all switches down- see the figure 5 below). The system can function at other baud rates; however, the RANPCSW must have the same communication parameters.

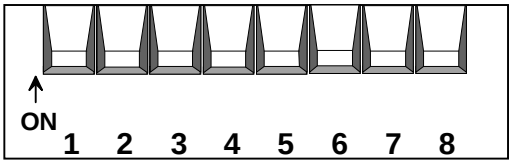


Figure 5. S1 DIP Switch Settings for the RANEXP (38,400 baud).

2. Mount the RANEXP into the rack.
3. Remove the front panel of the RANCC16 by loosening the four small thumbscrews.
4. If you already have an existing system, remove the old RANCPU and put it into a static bag.
5. Secure the front panel of the RANCC16.
6. Connect a 12 VDC power supply (e.g., RANPS12) to power up the RANEXP and/or RANCC16.
7. Connect the RANEXP's AXLINK 1 port to the RANCC16's AXLINK port with a control cable (e.g., West Penn D291). The following table specifies the connections you will need to make.

Table 6. RANCC16 (AXLINK) to RANEXP (AXLINK 1) Connections

RANCC16 AXLINK Connectors	Belden 8102	RANEXP (AXLINK 1)
Power (+)	No Connection	No Connection
AXP	Red	AXP
AXM	Black	AXM
GND (-)	Shield	GND

Notes:

A. This is the only connection between the RANEXP (AXLINK 1) and the RANCC16 AXLINK. All other AXLINKS get connected to the RANEXP (AXLINK 2 to AXLINK 12) from the punch block(s).

B. This will make it easy to debug a system, because if there is a problem with the AXLINK in the system, you will still have communication with the system and the RANEXP (CPU).

Completing the Wiring of the RANEXP

1. The number of punch blocks (S66B3-75) you need depends on the length of your cable runs and the way you configure the RANEXP ports. Once you determine your control-cable configuration, connect the appropriate port to the punch block that you designate.
2. If you are expanding an existing system, remove the VW2302 interface cable from the RANCC16's "MC1" RS232 port and connect it to the RANEXP's ("Program") port.

3. Connect the other end of the VW2302 interface cable to the RANPCSW's Serial/Com 2 port.

RANBROAD Master Port Expander

The RANBROAD is a Master Port Expander that replaces the RANEXP. Each RANBROAD accommodates ten runs of cable with a maximum of 60,000 pF. It requires 12 VDC at 200 mA and is mounted in a single-rack space (1.75"). Two RS232 ports are provided for sending the RS485 control signal over fiber cabling when used with a fiber modem. Refer to the tables above in the "RANEXP" section to calculate the number of RANBROAD ports needed for your system. The RANBROAD is typically connected directly to the RANPCSW computer for programming purposes via a VW2302 cable.

Parts Required

1 RANCPU Control System Master Card

4 Mounting screws and washers (supplied with the RANBROAD) or four mounting screws (RB Part # B0439) and four washers (RB Part # WL0315)

1 Six-terminal punch block (Graybar part # S66B3-75)

1 One-pair shielded cable for connecting AMX Control Link

1 Serial Interface cable (supplied with the RANPCSW or refer to drawing VW2379)

1 18-gage power wires (black and red)

1 12 VDC power source (e.g., RANPS12)

Associated Equipment

1 RANCC16 Control Card Cage

1 Terminal punch-block (Graybar SS66B3-75)

1 RANPS12 Power Supply

1 Fiber Modem (one per building)

Installation

1. If you have not already done so, mount the RANBROAD into the rack.

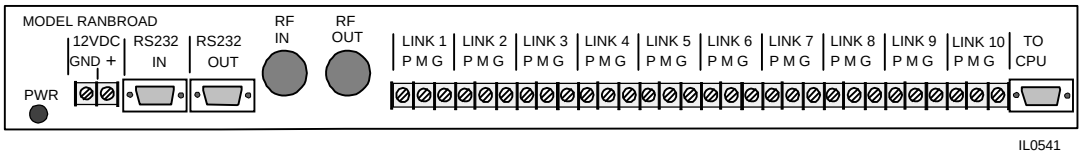


Figure 6. RANBROAD Connections.

1. Connect 12 VDC power to the appropriate "12 VDC" terminals on the left rear side of the unit. They are labeled "Gnd," and "+."
2. Remove the front cover of the RANBROAD by removing the two screws that hold the cover on.
3. Insert the RANCPU into the RANBROAD card edge guides until it locks into place.
4. Set the DIP switch settings as described in the RANCPU section.

5. Connect your RANBROAD's "Link 1" port to the RANCC16's "Axlink" port with a control cable (e.g., West Penn D291 or Belden 8102). The following table specifies the necessary connections:

Table 7. RANCC16 (AXLINK) to RANBROAD (LINK 1) Connections

RANCC16 AXLINK Connectors	WP D291	RANBROAD (Link 1)
Power (+)	No Connection	Not Available
AXP	Red	P
AXM	Black	M
GND (-)	Shield	G

Notes:

A. This is the only connection between the RANBROAD (Link 1) and the RANCC16 AXLINK. All other AXLINKS get connected to the RANBROAD (Link 2 to Link 10) from the punch blocks (see the next subsection).

B. This will make it easy to debug a system, because if there is a problem with the AXLINK in the system, you will still have communication with the system and the RANBROAD (CPU).

Completing the Wiring of the RANBROAD

1. The number of punch blocks (Siemon S66B3-75) needed depends on the length of your cable runs and the way you configure the RANBROAD links. Once you determine your control-cable configuration, connect the appropriate link to the punch block that you designate.
2. If you are expanding an existing system, remove the VW2302 interface cable from the RANCC16's "MC1" RS232 port and connect it to the RANBROAD's ("Program") port.
3. Connect the other end of theVW2302 interface cable to the RANPCSW's Serial/Com 2 port.
4. If you are using the RS232 outputs, the control signal can be sent over many different types of media, including fiber optics, modems, and RS232 Ethernet transceivers. There must be a bi-directional path, and the handshaking line (AXE) must run from the head end to the remote receivers. Contact RAULAND-BORG TECHNICAL SUPPORT ENGINEERING for recommended media equipment. Generally, wiring is done as follows:

- Field wiring for the ten pseudo RS485 link outputs is done via Link 1 through Link 10 screw terminals, which are labeled as follows:

Table 8. RANBROAD Link Connections

ranbroad Label	Control Link Wire
P	AXP
M	AXM
G	Ground

All sets are identical, so it doesn't matter which set is used, but it is good practice to reserve Link 1 for exclusive use by the RANCC16s in the head-end rack.

- The connections to RANCL101CP, RANCL201CP or RANCLASS1 panels are usually done by running a West Penn D291 or equivalent wire to a Siemon S66B3-75 punch block

and grouping classrooms so that no output exceeds 50,000 pF of capacitance. The following table specifies the allowed distances:

Table 9. Maximum Cable Distances per run of RANBROAD

Cable	Capacitance (per foot)	Maximum Cumulative Distance (in feet)
WP D291	26	2300
WP 291	45	1200
WP D2401	14.5	4000
WP D252401 (Plenum)	14.5	4000
Belden 8102	12.5	4500

- The "To CPU" terminal of the first RANBROAD is generally connected to Com 2 of the RANPCSW Media Center. This port is used for Control System maintenance, such as downloading Control Code, changing the Send Panel Program, and sending IR codes.
- The "RS232 In" and "RS232 Out" male DB9 connectors are used to allow the control-link pseudo RS485 signal to be converted to RS232, travel via fiber or dedicated modem, etc. The data rate is 19.2 kb. However, the data structure does not follow conventional asynchronous formats such as those used by PCs. The "RS232 Out" originates with the first RANBROAD, which contains the RANCPU, and is connected to the **"**RS232 In" connector on the second RANBROAD. In like manner, the second RANBROAD's "RS232 Out" connector can be connected to a third RANBROAD's "RS232 In" connector. At this time it is not known how many layers deep this can go. The pinouts of these connectors follow:

Table 10.

Pin Number	RS232 Out	RS232 In	Comments
1	LED (out)	LED (in)	Flashes "CPU Active" LED on front (optional)
2	RxD (in)	TxD (out)	Required
3	TxD (out)	RxD (in)	Required
4	DTR (out)	DTR (in)	Required
5	GND	GND	Required

If the units are in the same rack, wire them together by connecting Pin 1 to Pin 1, Pin 2 to Pin 2, etc. If the units are more than 50 feet apart, connect Pins 1–5 . to the appropriate pins on the RS232 fiber transceiver or modem. The pinouts of the standard DB9 and DB25 connectors used in these devices follow:

Table 11. RS232C 9-Pin Connector

Pin Number	Signal Description
1	Carrier Detect (CD)
2	Receive Data (RD)
3	Transmit Data (TD)
4	Data Terminal Ready (DTR)
5	Signal Ground (GND)
6	Data Set Ready (DSR)
7	Request To Send (RTS)
8	Clear To Send (CTS)
9	Ring Indicator (RI)

Table 12. RS232C 25-Pin Connector

Pin Number	Signal Description
1	Frame Ground (GND)
2	Transmit Data (TD)
3	Receive Data (RD)
4	Request To Send (RTS)
5	Clear To Send (CTS)
6	Data Set Ready (DSR)
7	Signal Ground (GND)
8	Carrier Detect (CD)
9	+ Transmit Current Loop Return
11	– Transmit Current Loop Data
18	+ Receive Current Loop Data
20	Data Terminal Ready (DTR)
22	Ring Indicator (RI)
25	– Receive Current Loop Return

Table 13. 9-Pin to 25-Pin rs232c Conversion

9-Pin Number	25-Pin Number	Signal Description
1	8	Carrier Detect (CD)
2	3	Receive Data (RD)
3	2	Transmit Data (TD)
4	20	Data Terminal Ready (DTR)
5	7	Signal Ground (GND)
6	6	Data Set Ready (DSR)
7	4	Request To Send (RTS)
8	5	Clear To Send (CTS)
9	22	Ring Indicator (RI)

Front Panel LEDs

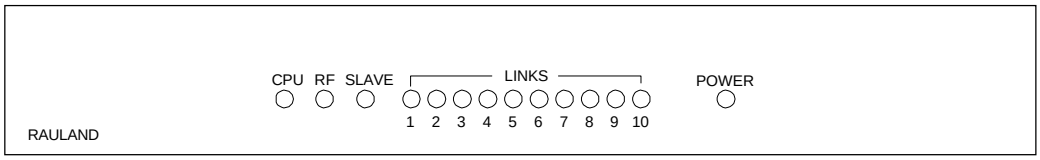


Figure 7. Front Panel

The front panel LEDs have the following meaning:

LED	Meaning
cpu	This green LED should flash once per second. If it flashes at another rate, there is a problem with the RS232, RF, or Link outputs. If it glows steadily, this may mean that the RANCPU has not yet been downloaded with a program. This is OK: the lED should start flashing normally after the control program has been downloaded—unless there is a Link problem.
RF	Indicates that data is being received on the RF input. This LED should be off unless the RANBROAD has the optional RF section. If this LED is constantly on, contact Rauland Borg.
Slave	Indicates that data is being received on the RS232 Out connector.. If this LED is constantly on remove the RS232 Out connector and the RS232 In connector to see when it goes off.
Links 1–10	Indicates that data is being received on the RS232 Out connector.. If this LED is constantly on, remove the appropriate field wiring
Power	Indicates that the unit is powered up.

Table 14. Front-Panel LEDs

RANEXPAD Master Port Expander

The RANEXPAD is a Master Port Expander that provides additional ports beyond those available on a RANEXP (12+). You must have at least one RANEXP before you can add an RANEXPAD. Each RANEXPAD adds an additional set of 12 runs of cable (with a maximum of 60,000 pF). It requires 12 VDC at 200 mA and is mounted in a single rack space (1.75"). The RANEXPAD must be mounted in the same head-end as the RANEXP.

Parts Required

1 RANEXP Master Port Expander

4 Mounting screws and washers (supplied with the RANEXPAD) or four mounting screws (RB Part # B0439) and four washers (RB Part # WL0315)

12 Four-pin Phoenix connector (supplied with the RANEXPAD)

1 Pair shielded cable for connecting AMX Control Link

1 Connecting loop cable (one supplied per unit)

Associated Equipment

1 Six-terminal punch block (Graybar part # S66B3-75)

1 12 VDC power source (e.g., RANPS12)

1 RANCC16 Control Card Cage

Installation

1. Mount the RANEXPAD (near the RANEXP).
2. Connect the loop cable (supplied with RANEXPAD) from the Expansion "Out" port of the RANEXP to the Expansion "In" port on the RANEXPAD. For every additional RANEXPAD unit, route a cable from the previous unit's *RANEXPAD* "Out" port to the next unit's *RANEXPAD* "In" port.
3. Connect a 12 VDC power supply to the RANEXPAD (e.g., RANPS12).
4. Connect the classroom runs from the RANEXPAD "Axlinks" ports to the punch blocks (Graybar part # S66B3-75).

Connections and Settings of the Control PC

The Control PC is required for all Ranger systems that have more than 120 classrooms or operator consoles. A classroom may comprise any combination of RANCLASS1s, RANCLX01CPS, Lesson Plan Workstations, or RaNCL100s (for older systems). Although Version 4.51 contains the last new features that will be developed for the RANCPU-based control system, Rauland-Borg will continue to provide support and address any bugs that may be uncovered.

Wiring of the Control PC and Hardware Settings

The Control PC communicates with the RANPCSW Media Center computer via a DB9-to-DB9 cable with the following wiring:

Table 14. Control PC Cable

Media Center PC	Control PC	Use
2	3	TxD
3	2	RxD
5	5	Gnd

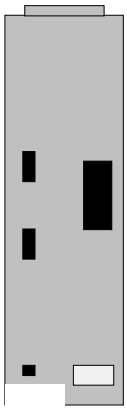
Connect the cable from Com 1 of the Media Center computer to Com 1 of the Control PC. The Control PC talks to the Control System via its own Com 2 and Slot 16 of the first RANCC16 with a RAN232 whose switches are all on (38,400, no parity, 1 stop bit, 8 data bits). Note that the baud rate of a Control System based on the RANCPU alone is 19,200.

As before, Com 2 of the Media Center PC can be connected to the DB9 on the RANCC16, the RANEXP, or the RANBROAD. This connection is used for diagnostics, such as downloading the Control Program, configuring IR devices (e.g., RANIRs and RANCLS01CPS), and running the Send Panel Program.

Software Settings

In the Media Center computer, close the Media Center software. Under the Main Program group, open the Control Panel and select Ports. Make sure that Port 1 is set to 19,200, no parity, 1 stop bit, 8 data bits, and **no flow control**. (The setting for only an RANCPU is the same except that the hardware flow is on.) These settings are not adjustable in the Control PC.

RAN232 Serial Control Card



Many of the RANGER system's devices are controlled via RS232 control. In order to provide a universal operating interface for all media devices, the RANGER system emulates these devices' original remote control units with the RAN232, a serial control card that fits in the RANCC16 Control Card Cage. Each device controlled via RS232 serial commands (e.g., RANLASER, RANMENU, and RANPCSW Media Center Computer) must have an RAN232 card associated with it. Additionally these cards must be appropriately configured for the communication parameters of the associated device. The RAN232 card mounts in the RANCC16 Control Card Cage and requires 12 VDC at 125 mA power, which is supplied by the RANCC16.

Parts Required

1 Interface serial cable (check the table below for the appropriate cable for the device that you are configuring).

Associated Equipment

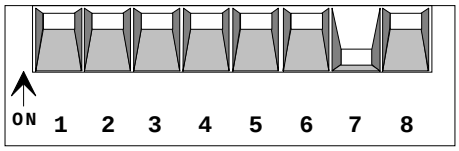
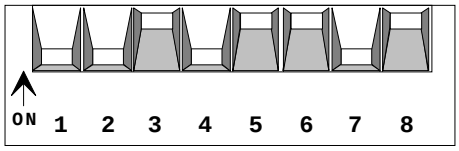
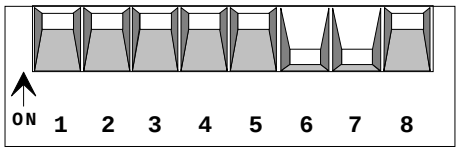
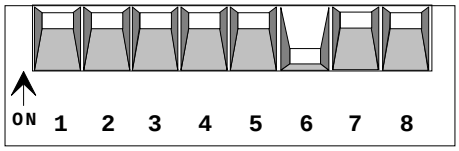
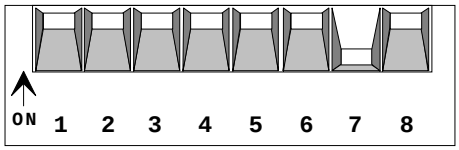
1 RANCC16 Control Card Cage (see the section on the RANCC16 for more information)

Installation

Note: *Discharge static electricity from your clothes or body before handling the RAN232 card. Touch a metal surface to ground yourself or use a grounding strap.*

1. If you have not already done so, mount the RANCC16 into the rack.
2. If it is not already off, remove the front panel of the RANCC16 by loosening the four small thumbscrews.
3. Set the DIP switches on the RAN232 card to the appropriate settings for the device that you will be controlling (e.g., RANMENU)

Table 15. RAN232 S1 DIP Switch Settings

Resource	DIP Switch Setting
AutoPatch Switch	
RAN[xx]VS[yy]	
RANLASER	
RANPCSW	
RANMENU	

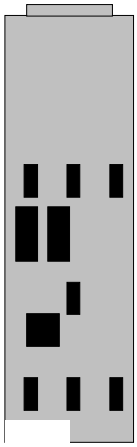
Note: *You may use any RANCC16 (#1) slot except for 5 and 16, which are reserved by the system for controlling the Video Matrix Switch and communicating with the control system, respectively.*

4. Slide the RAN232 card between the upper and lower white guides on the RANCC16 until it snaps into place.
5. If you will not be installing additional cards, replace the front panel of the RANCC16.
6. Each RS232-controlled device that you are installing has a corresponding cable that goes with it (see the following table). Connect the stripped ends of the corresponding cable into the top eight pins of the appropriate RAN232 card's connector. You will find these connectors in the package of the RAN232. Each connector is labeled with its corresponding slot number.

Table 16. Resource RS232 Card Cable Chart

Resource	Cable	From	To
ranpcsw	VW2293-1 (supplied with the RANPCSW) or VW2378	RANCC16 Slot 16	RANPCSW Serial Port 1
ranlaser	VW2292 or VW2293	RANCC16 Predetermined Resource Slot Location	RANLASER Interface Connector
ran[xx]vs[yy] (Video Matrix Switch)	VW2374	RANCC16 Slot 5	Utah Scientific Video Matrix Switch's rs232 Port
AutoPatch Switch	VW2395	RANCC16 Slot 5	Auto Patch's rs232 Port
rantitler	VW2353	DB-25 CONNECTOR (AMIGA)	RANCC16 Predetermined Resource Location Slot
ranmenu	VW2378	RANMENU'S PC SERIAL PORT	RANCC16 Predetermined Resource Location Slot

RANIR Infrared Control Card



Many of the devices that are operated through the RANGER system are infrared-controlled. In order to provide a universal operating interface for all media devices, the RANGER system emulates these devices' original remote control units with the RANIR, an infrared control card that fits in the RANCC16 Control Card Cage. Each IR controlled device (e.g., RANVCR, RANCDI, and RANVFLOP) must have a card associated with it. Additionally, these cards must be programmed with the appropriate IR codes (usually supplied by Rauland-Borg). The RANIR card mounts in the RANCC16 Control Card Cage and requires 12 VDC at 45 mA power source. If you are planning on including IR controlled devices that are not supplied by Rauland-Borg and you do not have an RANIRIS Infrared Capture Unit, please check with Rauland-Borg prior to installation about the availability of the proper IR codes for the devices you will be using (including classroom televisions). If these devices are not part of our "library," you may have to send the devices to Rauland-Borg for programming.

Parts Required

1 IR Transmitter Cable (RANIRCABLE per IR device). This cable is supplied with the RANIR Infrared Control Card.

1 IR programming file to match the device that you are installing (if the device was not provided by Rauland-Borg, you may need to send the manufacturer's remote to Rauland-Borg) or learn the codes using the RANIRIS Infrared Capture Unit.

Associated Equipment

1 RANCC16 Control Card Cage (see RANCC16 for more information)

1 RANIRIS Infrared Capture Unit (optional)

1 IRLIB program (supplied with all RANGER systems)

Installation

Note: Discharge static electricity from your clothes or body before handling the RANIR card. Touch a metal surface to ground yourself or use a grounding strap.

1. If you have not already done so, mount the RANCC16 into the rack.
2. If it is not already off, remove the front panel of the RANCC16 by loosening the four small thumbscrews.
3. Slide the RANIR card between the upper and lower white guides on the RANCC16 until it snaps into place.
4. If you will not be installing additional cards, replace the front panel of the RANCC16.

Note: You may use any RANCC16 (#1) slot except for 5 and 16, which are reserved by the system for controlling the Video Matrix Switch and communicating with control system, respectively.

Downloading IR codes to a RANIR card

Launching the IRLIB Program

1. From Windows Program Manager, find the RANGER Configuration program group and open it (it should look similar to Figure).The RANGER Configuration programs are DOS programs that will be run under Windows. If the computer has only one COM port available for the RANGER system, close MediaPC before starting IRLIB.

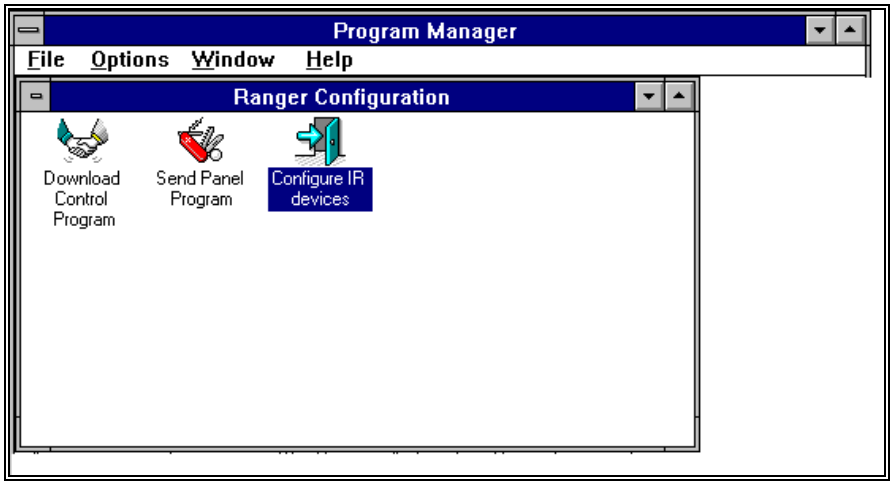


Figure 8. RANGER Configuration Group

2. Launch the IRLIB program by double-clicking on the “Configure IR Devices” program

icon.

3. A screen similar to the one shown in Figure will appear. If the program is configured properly, a message should appear in the lower part of your screen indicating "Master Present," as in the example. If this message does not appear, the program may not be using the correct serial port on your computer, the cable from the Media Center computer's serial port may not be connected correctly, or the baud rate setting may be incorrect.

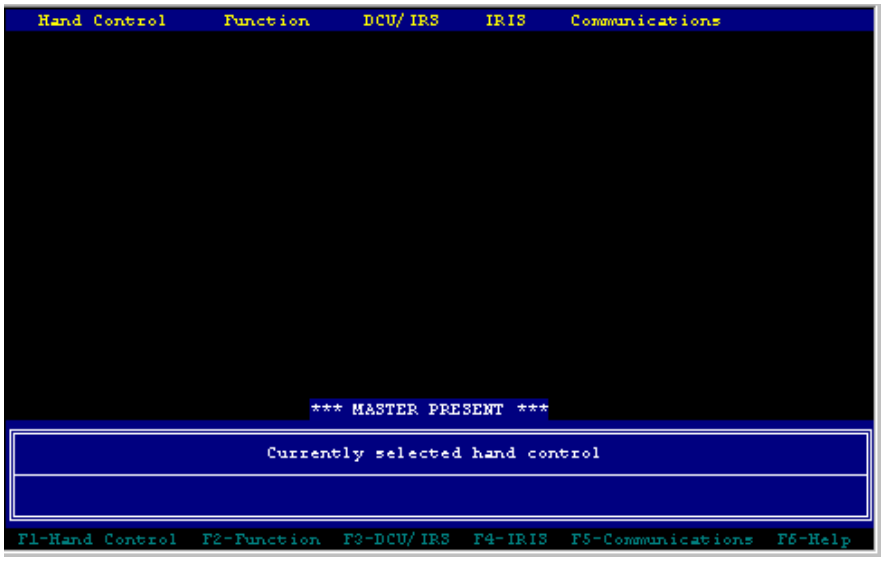


Figure 9. IRLIB Main Screen

IRLIB does not respond with "Master Present"

1. If the program does not report "Master Present," press *F5* to access the program's configuration parameters. This will bring up the menu shown in the following figure.

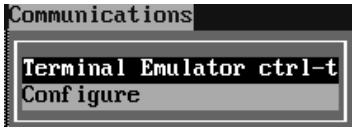


Figure 10. IRLIB Communications Menu

2. Move your cursor down so that you highlight the "Configure" option, then press *Enter*. This will bring you to the screen shown in Figure 5.

Figure 5. "IRLIB Configure" Dialog Box

3. Make sure that the check marks (√) match the setting that your system is using (i.e., the baud rate setting should match the settings on your RANCPU; these usually are Com 2, 38400, or, for a laptop. Com 1, 38,400). If the settings are correct, press *Esc* to exit the dialog box. If the settings do not match, change them accordingly by moving the cursor keys to the appropriate settings and pressing *Enter*. When the settings are correct they will have a √ next them. Press *F10* to exit the dialog box and return to the main menu. If the system still does not report "Master Present," call Rauland-Borg for technical assistance.

Selecting IR Devices and Programming the RANIR

The next step is to select the IR device whose commands the RANGER system will emulate and program the RANIR card that corresponds with it. Use the following procedure:

1. Press *F1* to access the "Hand Control" menu.
2. The cursor's position will default to the "Select" command. Press *Enter* to accept this choice. This will open the dialog box shown in Figure 6.

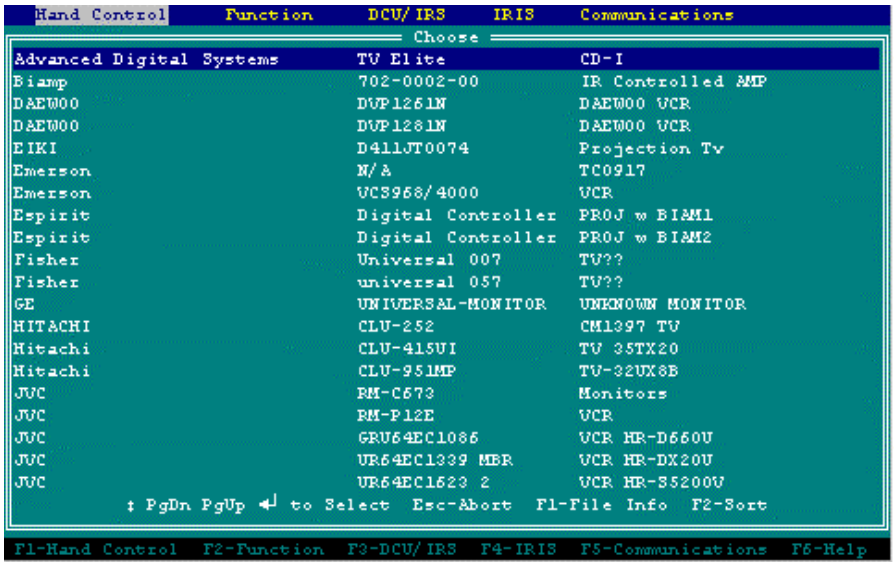


Figure 6. "Choose IR Device" Dialog Box

3. With the up and down arrows, move the cursor over the appropriate model number for the equipment you are using. A shortcut is to type the first letter of the manufacturer's name (e.g., "p" for Panasonic) and then scroll up or down to the right model. Once the appropriate device is selected, press *Enter*.
4. Press *Esc* to exit the "Choose IR Device" dialog.
5. Press *F3* to access the "DCU/IRS" menu as in Figure 7:

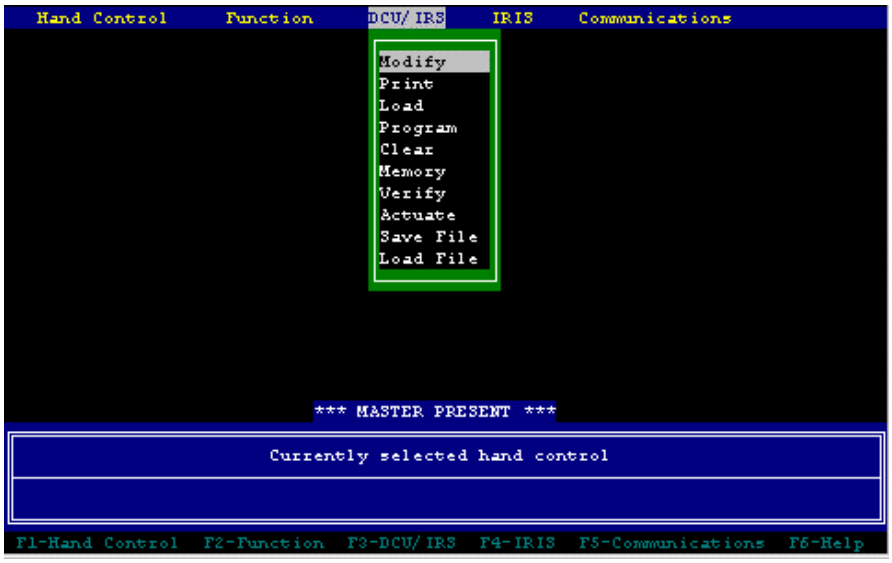


Figure 7. IRLIB DCU/IRS Menu

6. The cursor's position will default to the "Modify" command. Press *Enter* to accept this choice. This will open the dialog box shown in Figure 8:

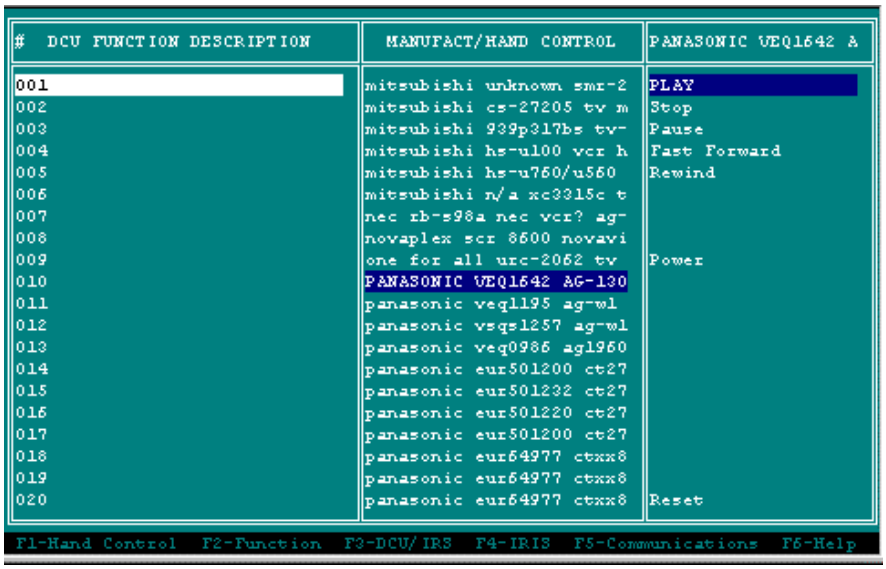


Figure 8. Modify IR Commands Dialog Box

7. Press *Alt + D* simultaneously to erase all the current IR codes for the chosen device. This will delete all the commands from the "DCU Function Description" column.

8. Now simultaneously press *Alt + C* to copy all new IR codes to the RANIR card. In some cases, the "DCU Function Description" column may still appear blank. This does not necessarily mean that there are no commands there. The commands that you just copied may be stored under higher numbers, beyond the point that is visible on the screen. To check that the commands were correctly copied, use the *Page Down* key to scroll through the column. Note that all resources such as VCRs, IR-controlled laser disc players, etc., start at "1." The sole exception is classroom monitors, which start at "73."

9. Press *Esc* to exit the dialog box. After you have exited, the cursor should remain in the "DCU/IRS" menu.

10. Move the cursor to so that the "Program" option is highlighted as in Figure 9, then press *Enter*.

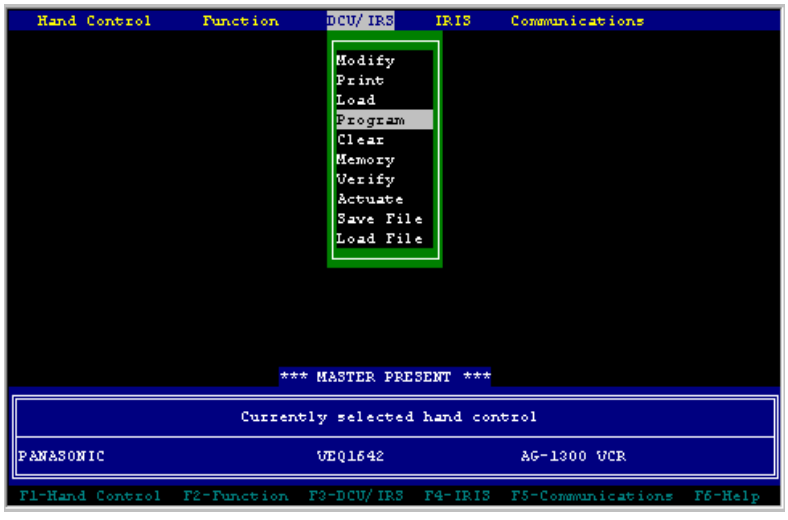


Figure 9. DCU/IRS Menu

11. You will now be prompted to enter a device number, as shown in Figure 10. The number you enter here should correspond to the physical slot number where the RANIR card is positioned or the RANCL101CP, RANCL201CP or RANCLASS1 address. In addition to "MC1" and "CS," there are sixteen possible slot locations in each RANCC16. The card cage has numbers in front of each card's location. Find the card that your are programming. Type in this number and press *Enter*. If the device is an RANCL101CP, RANCL201CP or RANCLASS1 type in its address and press *Enter*. If the program reports "Error in Clearing," you may have chosen the wrong card or classroom address, or your control system may not be configured correctly. See "IRLIB does not Respond with Master Present" earlier in this section for more information.

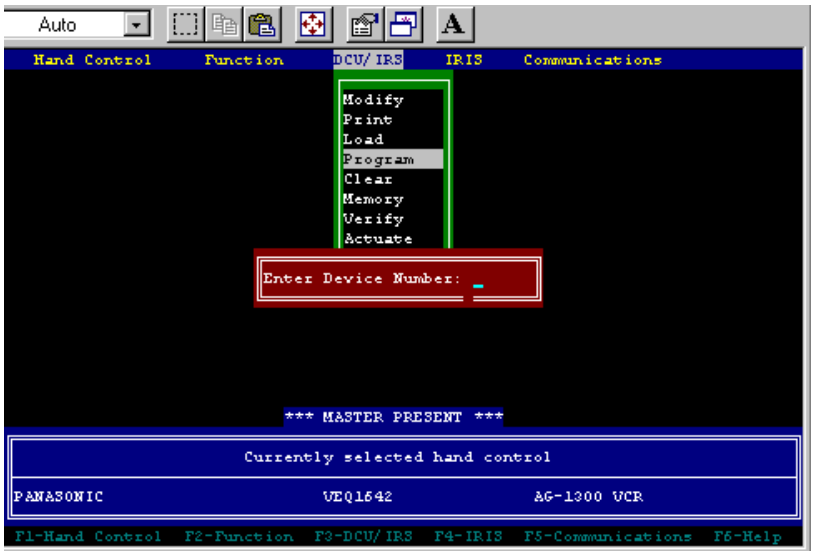


Figure 10. "Enter Device Number" Dialog Box

12. Assuming you have chosen the appropriate device number, your screen should now display an information box showing the progress of your IR programming as in.

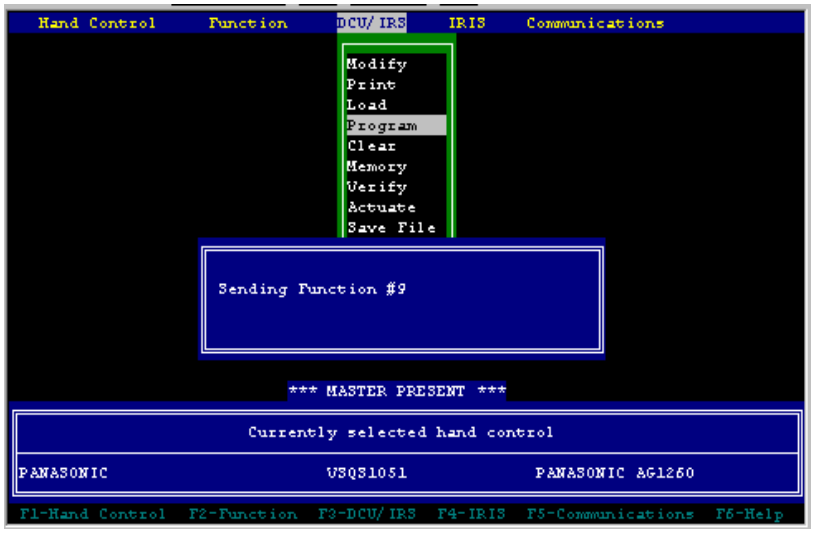


Figure 11. Transferring of IR Functions

13. When this is complete, the information box will respond with the message: "Transfer

Accepted." Press *Esc* to exit this screen.

14. Repeat this procedure for all the RANIR cards, RANCL101CP, RANCL201CP or RANCLASS1s that you need to set up.
15. When you have completed programming IR cards, simultaneously press *Ctrl* + *X* to exit the program.

Wiring IR Transmitter Cables

1. Each IR device that you are installing has a corresponding IR Transmitter Cable (RANIRCABLE). This cable is plugged into the top two pins of the appropriate RANIR card's connector. You will find these connectors on the back of RANCC16 card cage. Each connector is labeled with the slot number to which it corresponds.
2. Place the emitter portion of the IR Transmitter Cable over the corresponding resource's IR sensor window. When the system is completely on-line, you might have to move the emitter around to find the proper location so that the device responds to the IR signals that the RANIR card is sending. Each package contains an extra double-sided stick tape, but be careful: you get only one try for each. You may want to use scotch tape on the IR emitter until the right spot has been confirmed.

RANIRIS Infrared Capture Unit

Many of the devices that are operated via the RANGER system are infrared-controlled. In order to provide a universal operating interface for all media devices, the RANGER system emulates these devices' original remote control units with the RANIR, an infrared control card that fits in the RANCC16 Control Card Cage. Each IR controlled device (e.g. RANVCR, RANCDI, IR-controlled laser disc player, RANIRPC, RANVFLOP, or RANVSTILL) must have a card associated with it. For control at the classroom television, use a RANCL101CP, RANCL201CP, or RANCLASS1. Additionally these cards must be programmed with the appropriate IR codes (usually supplied by Rauland-Borg). The RANIRIS is an optional external unit that allows authorized Rauland-Borg distributors to create custom IR codes to match units with remotes that do not have codes supplied by Rauland-Borg Corporation.

Parts Required

1 RANIRLIB (software to create and download IR library—not included)

1 Nine-Pin female data connector to connect from RANIRIS RS232 port to serial port on a PC (not included) VW2293

Associated Equipment

1 RANPCSW (RANGER Media Center computer) or other PC compatible with a free RS232 port (not included)

Installation

Connecting and Configuring the RANIRIS

1. Connect the nine-pin-female-to-nine-pin-female serial cable between the PC's "Com 1" and the RANIRIS RS232 port.
2. Connect the 12-volt power supply's green connector to the RANIRIS's "12V" connector. When the unit is powered up and operational, the front-panel LCD should display "01" as in the following example:

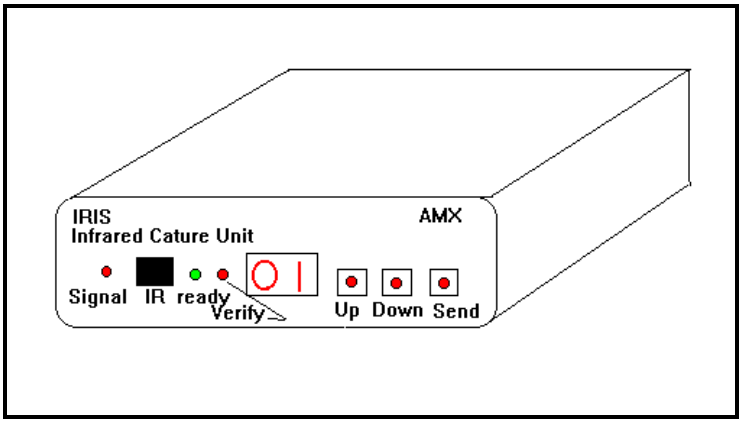


Figure 12. IRIS Infrared Capture Unit

3. If your computer is running Windows®, close it now.
4. If you do not already have one, make a directory called "C:\AMX." If you are using a RANPCSW computer, there should already be a "C:\AMX" directory containing IRLIB software and a set of IR libraries for the most commonly used RANGER devices.
5. If the program IRLIB is not already installed on the computer that you will be using for IR capture, copy the program IRLIB.EXE to the C:\AMX directory.
6. If you are not already in the C:\AMX directory, use the DOS "CD" command to navigate to it (**CD C:\AMX**).
7. Launch the IRLIB program by typing IRLIB at the C:\AMX> prompt. Your screen should appear similar to the following example:

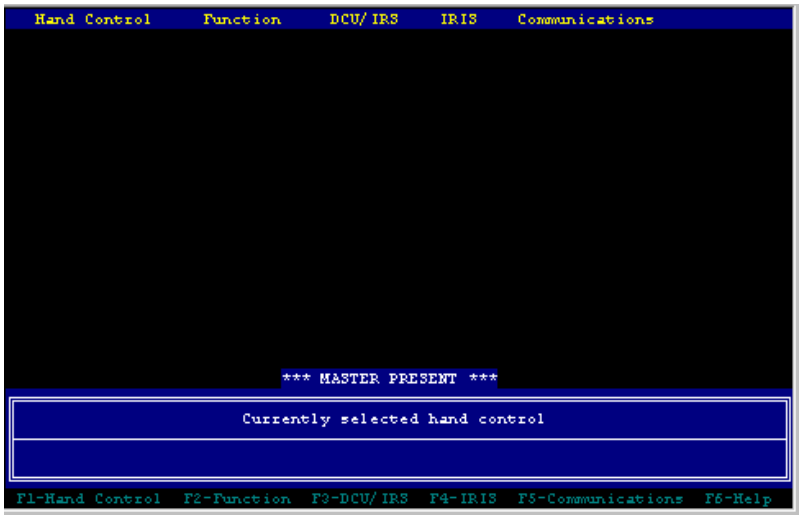


Figure 13. Launching the IRLIB Program

8. Press *F5* to open the "Communications" menu. Use the cursor key to move down to the Configure option and press *Enter*. A dialog box similar to one in Figure 14 should appear on your screen.

Figure 14. "Configure" Dialog Box

9. Match the COM port settings to those that you will use for your capture session. A check mark (√) should appear next to the COM port that you are using. While the COM port settings may vary from machine to machine, the Baud rate must be set to 9600 for IR capture to work. If you are using the RANPCSW media center computer, the baud rate will likely be set to 38,400. Change it for this capture session, but remember that you will need to change it back when you download new control programs to your RANCPU or your RANIR cards. If you needed to make changes, press *F10* to save your new configuration information.

Capturing a New Function

During the next procedure you will literally send and capture all the functions of the media device's original manufacturer's remote that can be emulated by the

RANGER remote control unit (RANHHELD). In most cases the system will not use all the manufacturer's remote's functions. For RANGER remotes to function properly, you will need to place the functions that you capture within a very specific template (e.g., Television Power will be associated with RANGER remote's function 73). In working with a remote with which you are unfamiliar, it is often helpful to have manufacturer's manual as you capture its functions. In this way, you can determine the RANGER system equivalents of these functions.

Installation

Note: *The Hand Control number refers to the model number and the controlled equipment refers to what is being controlled by the remote.*

1. Access the IRLIB program's IRIS menu by pressing *F4*. Now move the cursor down to "CAPTURE NEW" and press *Enter*.
2. The screen will show a dialog box that asks for information about the hand controller you are going to program. The first prompt will ask you to "Enter Manufacturer." Enter the name of the manufacturer and press *Enter*. Next you will be prompted to enter the "Hand Control #." Enter the manufacturer's part number for the remote (look on the back of the unit) and press *Enter*. Finally you will be prompted to enter "Controlled Equipment." Enter the appropriate information and press *Enter*. This information is for cataloging purposes only.

Figure 15. Capture New Screen

Note: *Find the number of the function you want to program from the list below.*

3. After you have entered the information about the controlled equipment, the "Function List" dialog box will appear on your screen as in the following example.

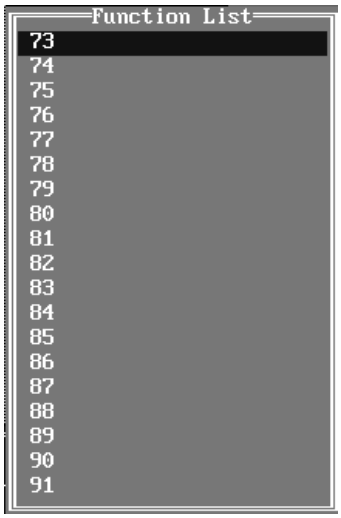


Figure 16. Function List

4. Consult the templates maps at the end of this section for information regarding the location of the functions that the RANGER system's RANHHELD emulate. We have provided a template map for TV, VCR, VFLOP (or VSTILL), IR laser disc, CD-ROM and for CD-I.

5. Working backwards from these provided templates, begin building your library. Use the cursor keys to navigate the function list and find the corresponding number for the function you are capturing. When you get to the number, press *Enter*. Type in the function name and press *Enter* again. Your screen should now appear similar to the one shown in the following example. Notice the message in the right-hand portion of your screen indicating that the software is "Waiting for Function." You are now ready to begin capturing the function that you have specified.

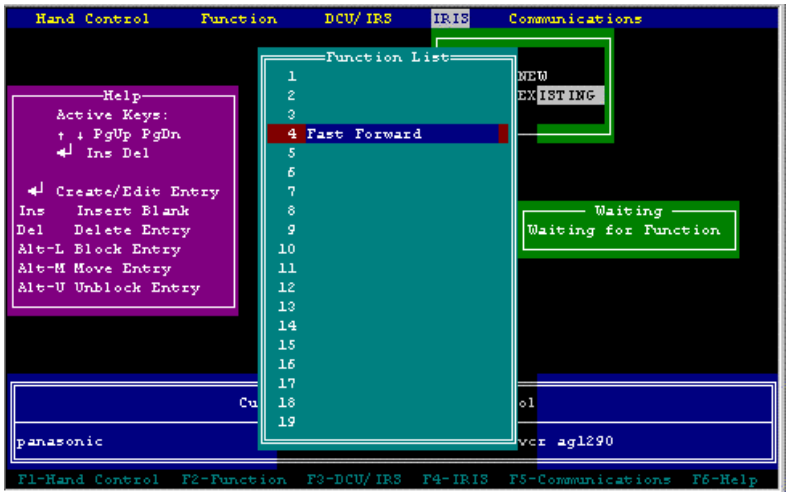


Figure 17. Function List

6. The RANIRIS should have a green "Ready" light on, and the LCD should display "01." It is best to work in a room that is not very bright, and away from sunlight. Place the manufacturer's remote a few inches from the sensor and press the button of the function you want to capture. Hold the button down until the green ready light goes off. Do not move the remote until after the next step has been completed.

7. After a few seconds, the red "Verify" light and "Ready" light should both light. To verify that the signal has been captured, press the same function button again until the "Ready" light goes out.

8. When the RANIRIS is ready to send the signal to the PC, the "Send" light/button will come on. Press the "Send" button on the RANIRIS to transfer the captured code to the PC. The characters will appear on the box verifying that the signal is being sent without problems. The IRLIB program will display a message box indicating that the program is "Loading the function." After the function has been properly loaded, the program will display the message box shown in Figure 18, indicating that the transfer was successful. Pressing any key will return you to the function list.

Figure 18. Function Loaded Indication

Note: Remember to do this for every function on each remote you wish to program, including numbers.

9. Repeat the steps as many times as necessary to capture all the functions that correspond with the template that we have provided.

10. When you have captured a device's functions, you will need to download its associated control equipment (RANIR, RANCL101CP, RANCLASS2, RANCL201CP, or RANCLASS1). See the "RANIR" section for more information on using IRLIB to send functions to a control device.

IR Template Maps

The following tables map the function positions for the most commonly used RANGER media devices. Remember that each controlled function has a unique position. If you do not put the functions in the appropriate positions, the RANGER remote control will not function correctly with the corresponding device.

Table 17. IR Templates

VFLOP Controller Template		Computer/CDI Controller Template	
Function Location	**Function**	**Function Location**	**Function**
1	Play	1	Play
3	Display	2	Stop
6	Forward	3	Pause
7	Rewind	6	Search Fwd.
9	Power	7	Search Rew.
10	0	10	0
11	1	11	1
12	2	12	2
13	3	13	3
14	4	14	4
15	5	15	5
16	6	16	6
17	7	17	7
18	8	18	8
19	9	19	9.
21	Enter	22	Tracking Down
22	Auto Increase	23	Tracking Up
23	Auto Decrease	26	Mute
29	Pb/line in	30	System/Stand By
30	OSD	31	Screen
42	Clear	40	Joystick Up (cursor up for computer)
		41	Joystick Down (cursor down for computer)
		42	Joystick Right (cursor right for computer)
		43	Joystick Left (cursor left for computer)
		44	Upper Left Control (left mouse click for computer)
		45	Lower Left Control (right mouse click for computer)
		50	Fast Joystick Up (cursor up for computer)
		51	Fast Joystick Down (cursor down for computer)
		52	Fast Joystick Right (cursor right for computer)
		53	Fast Joystick Left (cursor left for computer)

Table 18. IR Templates (cont'd)

Function Location	Panel Button Pressed	IR Button Pressed	Laser Function
1	Play	Play	Play
3	Pause	Pause	Pause
4	Fast Forward	---	Scan Forward
5	Rewind	---	Scan Back
6	Step Forward	Fast Forward	Step Forward
7	Step Back	Rewind	Step Back
9	Stop	Stop	Stop
10	0	0	0
11	1	1	1
12	2	2	2
13	3	3	3
14	4	4	4
15	5	5	5
16	6	6	6
17	7	7	7
18	8	8	8
19	9	9	9
21	Enter	Enter	Enter
22	---	---	---
23	---	---	---
29	---	---	Audio Channel
30	Frame Enter	Frame Enter	Display
42	Clear	Clear	Clear
43	Frame	Frame	Frame/Time/ Chapter

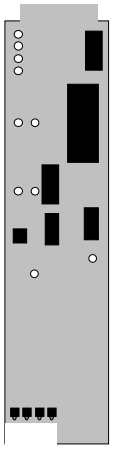
Table 19. IR Templates (cont'd)

TV Controller Template		VCR Controller Template	
Function Location	**Function**	**Function Location**	**Function**
73	Power	1	Play
74	0	2	Stop
75	1	3	Pause
76	2	4	F. Forward
77	3	5	Rewind
78	4	6	Time Search
79	5	7	Bookmark Search
80	6	8	Record
81	7	9	Power
82	8	10	0
83	9	11	1
84	Enter	12	2
85	Follow Up	13	3
86	Channel +	14	4
87	Channel -	15	5
88	Volume +	16	6
89	Volume -	17	7
90	Mute	18	8
91	TV off	19	9
92	Menu	20	Clear
93	TV/Video	21	Power Off
94	Menu up	22	Channel Up
95	Menu down	23	Channel Down
96	Menu left	24	Click Up
97	Menu right	25	Click Down
100	TV on 1	26	Click
101	TV on 2	29	TV/VCR
102	TV on 3	44	Eject
103	TV on 4	45	Counter Memory
104	TV on 5	46	Clock/CNTR Select
105	TV on 6	47	Recall (Display)
107	Closed Caption	48	Standby
109	RGB will pulse	49	Record (One Touch)

Table 20 IR Templates (cont'd)

TV Controller Template		VCR Controller Template	
Function Location	**Function**	**Function Location**	**Function**
110	Line will pulse	50	Slow Motion
		51	Input Source
		52	Repeat Playback
		53	Program
		54	Monitor TV Channel
		55	Tape Speed Select
		56	Channel Scan Select
		57	2X Playback
		58	Still Advance
		59	Tracking -
		60	Tracking +
		61	Add/Delete

RANDTMF Interface Board



The RANDTMF card is an interface board that allows users to control RANGER resource media devices from telephones. The card mounts in the RANCC16 Control Card Cage and includes an RJ11 connector that interfaces with standard telephone lines. Users requiring control of RANGER media resources make a reservation for the media device through the RANGER Media Center or RANGER Remote Scheduling software, and then dial a specified extension or hunt group (if equipped with caller ID or intercept zones) to connect to the RANDTMF card. Once the card picks up, users can control the media device via the telephone keypad. The RANGER system can also be configured to automatically dial a Telecenter system during an All-page and send the correct touch-tone sequence to also initiate a Telecenter system All-page. One RANDTMF card is required for each simultaneous DTMF point-of-access. The card mounts in the RANCC16 Control Card Cage, which supplies the required 12 VDC at 90 mA power.

Note: The RANDTMF requires a 48 V subscriber loop and disconnect pulse at hang up.

Parts Required

1 Eight-pin DTMF interface board to RJ11 (supplied with the RANDTMF)

Associated Equipment

1 RANCC16 Control Card Cage

Telecenter® V, Telecenter System 21, and Telecenter DSI systems.

Installation

Note: *Discharge static electricity from your clothes or body before handling the RANDTMF card. Touch a metal surface to ground yourself or use a grounding strap.*

Note: *You may use any RANCC16 (#1) slot except for 5 and 16, which are reserved by the system for controlling the Video Matrix Switch and communicating with control system, respectively.*

1. If you have not already done so, mount the RANCC16 into the rack.
2. If it is not already off, remove the front panel of the RANCC16 by loosening the four small thumbscrews.
3. Slide the RANDTMF card between the upper and lower white guides of an open slot on the RANCC16 until it snaps into place.

Jumper Notes

a. If the Jumper marked *JP2* is installed between the center pin and "AAON," the RANDTMF will start up in the Auto Answer mode.

b. If the Jumper marked *JP1* is installed between the center pin and "PHONE" positions, the RANDTMF will start up in the Phone mode. If this Jumper is installed between the center pin and "Leased" position, the RANDTMF will start up in the Leased Line mode.

4. Snap the eight-pin DTMF interface board over the first eight pins into the top of the corresponding card connector on the back of the RANCC16.
5. Plug in the appropriate analog telephone line extension cable into the RJ11 Telco jack on the DTMF interface board.
6. After setting up and configuring the control cards, secure the front panel of the RANCC16.

Configuring the Media Center for a DTMF Classroom for Systems with no Caller ID or Intercept Zone Information

Once DTMF cards are added to the system, the cards must be added to RANGER Media Center's Classroom and Console Database. The card's RANCC16 slot number must be entered into the "Panel Ctrl Address" field, and the "Classroom Type" field must be set to DTMF control. For more information, see "System Database Setup."

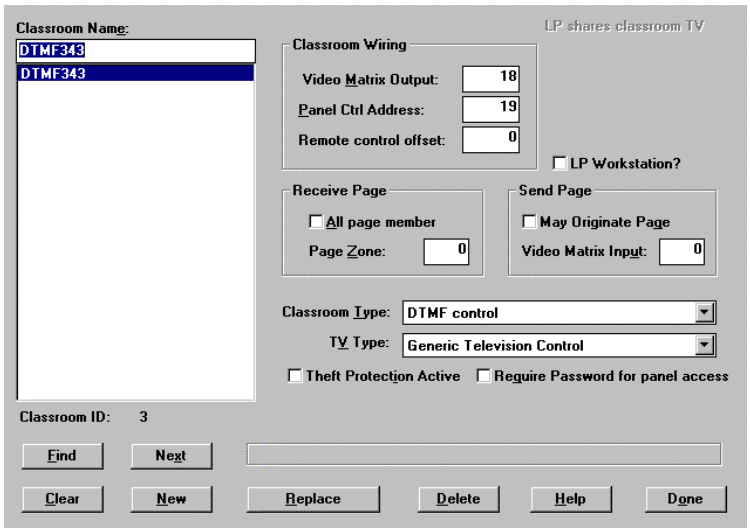


Figure 19. Media Center Configuration for DTMF classroom

Caller ID or Intercept Zone with DTMF Classrooms and DTMF Cards

When teamed with a phone system that can produce pure DTMF tones (like Telecenter® V or Telecenter® System 21) the RANGER system can process caller ID messages (as long as those messages are in the form of DTMF tones) to determine which classroom requires media control.

The information about the classroom is placed into the classroom database, but since the DTMF card in the RANCC16 rack is not assigned to any given classroom (it is available to all classrooms), the "Control Address" field holds the telephone extension number of the classroom.

In order for this to work, a new section must be added to your Mediapc.ini file. Use the following as an example.

[DTMF]

callerID=1
header_length=3
extension_length=3
extension_start=1
Num_DTMF_Cards=x
DTMF_Card_1=14
DTMF_Card_2=19

∫

DTMF_Card_x=47

Parameter	Description
caller ID:	Setting this to 0 (or eliminating the line completely) informs the RANGER system that caller ID does *not* exist on the system, and Configuration 1 takes over.
header_length:	This is the length of the header of the caller ID string.
extension_length:	This is the length of the extension number within the caller ID string.
extension_start:	This is the position that the extension number is located within the header of the caller ID string.
Num_DTMF_Cards:	This is the number of DTMF cards on the system.
DTMF_Card_x:	The value after the (=) is the control system address of the DTMF card. The value after the _ is simply the index of the DTMF card, ranging from 1 to x.

Figure 20. Mediapc.ini File

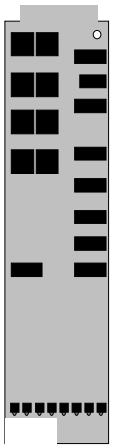
DTMF Classroom Operation

Once a media resource has been assigned to a DTMF classroom, users can operate media equipment using the following controls:

Table 23. dtmf Control

Phone key	RANGER Function/ Control Mode	RANGER Function/ Numeric Mode
1	Rewind/Step Back	1
2	Play	2
3	Fast Forward/Step Forward	3
4	Stop	4
5	Display	5
6	Pause	6
7	Search Up	7
8	Frame	8
9	Search Down	9
0	Chapter	0
*	Clear	Clear
#	Enter	Enter

RANRELAY8 Universal Relay Card



The RANRELAY8 is a universal relay card that provides eight isolated contact closures. The single-pole, double-throw (SPDT) relays are individually assignable and addressable as normally open (NO) or normally closed (NC) by moving a jumper provided on the card. These relays can be programmed to do a variety of functions in the RANGER system. Most notably, relay cards are used to trigger an alarm (such as a light or buzzer) that reminds staff that scheduled events are overdue for loading. Another typical application is configuring a relay to close when the theft of a classroom monitor is detected. The card has LEDs that indicate which relay is active. These cards can be linked so a larger number of functions can be controlled. Relays are rated 1 Amp at 28 VAC or DC. The RANRELAY8 is housed in the RANCC16 Control Card Cage, which provides the required 12 VDC at 150 mA power.

Parts Required

2 Eight-pin Phoenix connector (supplied with the RANRELAY8)

Associated Equipment

1 RANCC16 Control Card Cage

Corridor Lamps, Buzzer, 16 mm Film Converter, security system

Installation

Note: *Discharge static electricity from your clothes or body before handling the RANRELAY8 card. Touch a metal surface to ground yourself or use a grounding strap.*

Note: *You may use any RANCC16 (#1) slot except for 5 and 16, which are reserved by the system for controlling the Video Matrix Switch and communicating with control system, respectively.*

1. If you have not already done so, mount the RANCC16 into the rack.
2. If it is not already off, remove the front panel of the RANCC16 by loosening the four small thumbscrews.
3. Slide the RANRELAY8 card between the upper and lower white guides of an open slot in the RANCC16 until it snaps into place.

Jumper Notes

a. If jumper *J1* is installed between the center pin and "NC," Relay 1 is in the "Normally Closed" position.

b. If Jumper *J1* is installed between the center pin and "NO," Relay 1 is "Normally Open." (Use this configuration if you are using the relay card to trigger a warning light for the RANGER Media Center).

c. Each jumper (*J2–J8*) is numbered to correspond with the relay that it controls (e.g., *J2* controls relay 2). Configure each of these for "Normally Open" or "Closed" according to the directions specified for *J1*.

d. For a specified relay to operate, the corresponding jumper must be configured as either "Normally Open" (NO) or "Closed" (NC); otherwise the relay will not operate.

4. After setting up and configuring control cards, secure the front panel of the RANCC16.

Wiring the RANRELAY8

1. After inserting the RANRELAY8 card in to the RANCC16, wire the device that requires contact closure to the appropriate relay by using the appropriate pins on one of the eight-pin connectors supplied with the unit.

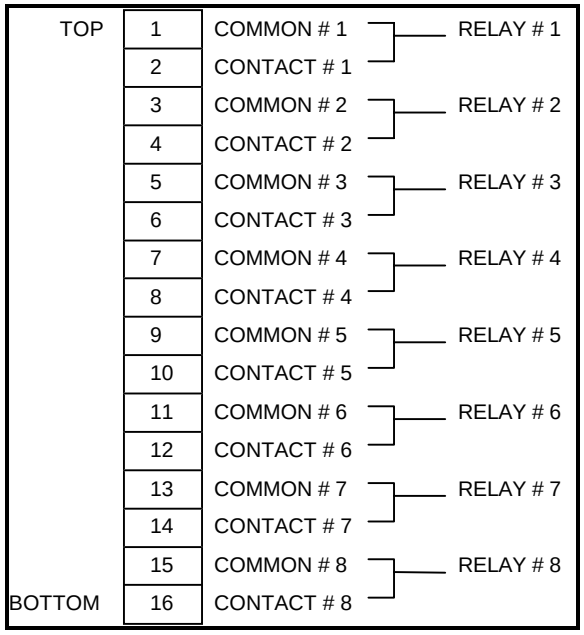


Figure 21. Pin Connections on the RANCC16 for the RANRELAY8 card

2. To reduce device wiring, you can select common adjacent relays. The chart below details the appropriate scheme.

Table 20. Common Adjacent Relays

Commons	From	To
C01–C02	Common # 1	Common #2
C02–-C03	Common #2	Common #3
C03–C04	Common #3	Common #4
C04–C05	Common #4	Common #5
C05–C06	Common #5	Common #6
C06–C07	Common #6	Common #7
C07–C08	Common #7	Common #8

Configuring Mediapc.ini for Alarms Triggered by Relays

The Mediapc.ini file has provisions for accepting assignment of relay cards to trigger alarms. To set up these parameters, you must use a text editor like Windows Notepad or DOS Edit. We will use Windows Notepad in our example.

Accessing the Mediapc.ini File

To access the Mediapc.ini file and open Windows Notepad simultaneously, use the following procedure.

1. If it is not already closed, close the Media Center program and return to the Program Manager screen.
2. Pull down the "File" menu and access the "Run" option as in the example below.

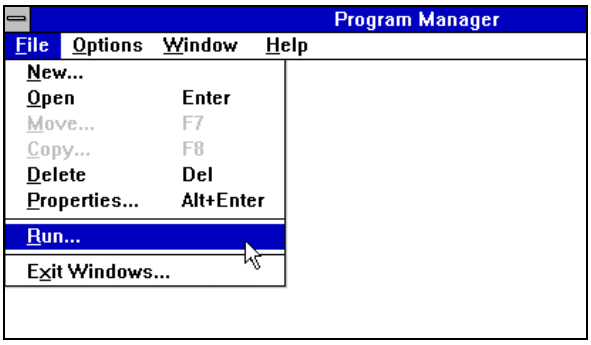


Figure 22. Program Manager: File Menu, Run Option

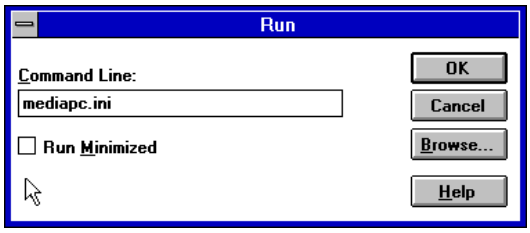


Figure 23. Program Manager: "Run" Command Line

3. You will be prompted with a command line as in the example above. Type in **Mediapc.ini** and click on the "OK" button. This will launch the Notepad text editor and open the file "Mediapc.ini."
4. Once Notepad is open, use the *Page Down* key to scroll through the file until you find the [alarms] section. The section should appear similar to the following example.

```
[alarm]     ; use 0 below to disable this feature for any type of alarm
address=13 ; card slot address with relay card in AMX rack
soon=1              ; relay used to notify when cware must be loaded soon
late=2   ; relay used when cware loading is LATE! (remains on until loaded)
theft=3             ; relay used when theft occurs (remains on until theft log examined)
```

Figure 24. Mediapc.ini File, Alarm Section

5. Modify the address line so that it matches the slot that your Relay card is installed in (in the example, the relay card is in slot 13).
6. If necessary, modify the "soon," "late," and "theft" lines so that they match the relays that you have chosen for triggering those alarms.

7. Go to Notepad's file menu and click on “Save.” You can now close Notepad.
8. Restart Media Center.
9. To test whether the relay is operational, schedule a courseware item to a time period in the near future. As the time approaches and passes, the relay will be triggered according to the parameters that you have specified.

   Default times are:

   a. “Load Soon” occurs 15 minutes before the scheduled courseware’s load time.
   b. “Late” occurs when the media Center’s computer clock passes the scheduled time.
   c. “Theft” occurs when a monitored classroom TV is unplugged from the classroom panel

Programming the RANRELAY8 as a Resource Controller

1. Start Media PC and log in as an Administrator.
2. Click on “Database” in the title bar and select “Edit Resources”.
3. Click on “New”. Move the cursor to the box under “Resource Name” and type in the name you will assign to the RAN RELAY8 card.
4. Push the Tab key and the cursor moves to the “Video Matrix Input” box.

   If this is a Baseband System, provide the video switch input assignment number to which the resource’s output is wired.

   If this is a Broadband System, provide the modulator channel number to which the resource’s output is wired.
5. Push the Tab key and the cursor moves to the “Controller Addr” box. Provide the RANCC16 slot number where you will install this RANRELAY8 card.
6. Push the Tab key and the cursor moves to the “Control Type” box. Click on the drop down arrow and select “Relay” from the list.
7. Push the TAB key and the cursor moves to the “Model Number” box. This is a test box where you can type any information about the resource.
8. Push the TAB key and the cursor moves to the “:Operational” box. Make sure an “X” appears in this box by clicking on it with the mouse.
9. Click on “Save” at the bottom of the screen. You should see the message “New Record Saved Successfully”. Click on “Done”.
10. Click on “Admin” on the Title Bar and select “Reset and Reload Controller” from the drop down list. Answer “Yes” to the dialog box that appears.

11. When the message "Link OK" appears at the lower right corner of the Media PC screen, you are ready to test the RANRELAY8 card functions (on RANCLASS1, RANHELD or DTMF Keypad).according to the following chart:

FUNCTION	RELAY	FUNCTION	RELAY
Stop	1	Step Back	5
Play	2	Step Forward	6
Rewind	3	Pause	7
Forward	4	—	8

Note: Relay 8 is not used.

RANPCIR Window's PC Air Mouse

The RANPCIR is used for remote control of the cursor and for left and right, single- or double-mouse clicks to control a CD-ROM program such as an "Encyclopedia." The RANPCIR connects to the parallel port of a head-end computer running Microsoft® Windows® 3.1, Windows 3.11, Windows95, or WindowsNT Client.

Parts Required

1 RANIR card with IR emitter cable

1 Computer running Microsoft Windows 3.1, 3.11, Windows95 or Windows NT. The computer must have a CD-ROM drive if CD-ROM programs are to be controlled.

1 VGA-to-NTSC converter

Associated Equipment

CD-ROM programs, Sound Card

RANAVMS2

Installation

Note: *Discharge static electricity from your clothes or body before handling the RANPCIR unit. Touch a metal surface to ground yourself or use a grounding strap.*

1. Connect the cable from the RANPCIR to the parallel port of the computer that is to be controlled.
2. Assign the computer in the resource database with a control type of CDI.
3. Connect a VW2290-372 audio/video cable from the sound card and the VGA-to-NTSC adapter to a RANAVMS2.
4. Connect the RANAVMS2 "mux" (multiplex) output into the "video switcher" input as specified in the resource database.
5. Plug in the power unit for the RANPCIR unit.
6. Turn on the RANPCIR's power switch. A red LED should light.
7. Place the IR emitter in front of the RANPCIR's lens. Place the IR cover supplied over the lens.
8. Put the disk, "Remote Mouse+" into the floppy drive of the computer that has the

CD-ROM drive.

9. In Windows, go to the Program Manager and click on *File*, *Run*, then type **a:install**. Follow the instructions of the install program.
10. After the program has been installed, move the Slideworks TV Tools icon to the Startup Group.

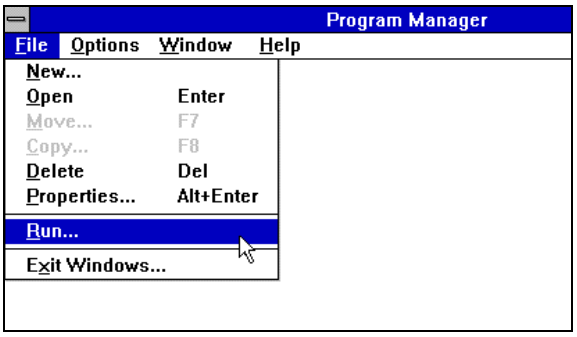


Figure 25. Program Manager "File" Menu, "Run" Option

Figure 26. Type "a:/install"

Figure 27. The TV Elite Program Group

RANPCSW Media Center Computer

Every RANGER system contains a RANPCSW that includes the Media Control PC, PC monitor, and software. The RANPCSW provides media scheduling, database software, media source-machine control and interface, interactive help, diagnostics, message screen displays, system setup, and configuration. A 486-66 MHz or faster computer is included with the RANPCSW. If rack-mounting the RANPCSW (this is not required), use a RANMONMNT, RANSHELF, or RANKEYMNT.

Parts Required

1 Interface cable (refer to drawing VW2379) (interface cable that connects RANGER PC (Serial Port–Com 2) to RANCPU (MC1 RS232) (supplied)

1 Interface cable (refer to drawing VW2293-1) (interface cable connects RANCC16 [Slot 16] to RANGER PC [Serial 1–Com 1]) (supplied)

1 AC Outlet

Associated Equipment

1 RANSHELF rack mount kit

1 RANKEYMNT (computer keyboard mount)

1 RANMONMNT

1 Power cord (supplied with the RANPCSW)

1 RAN232 serial control card (see "RAN232" for more information)

Installation

Mounting the Computer and Monitor

1. If it is not already assembled, assemble the RANMONMNT (unit ships with instructions).
2. Once it is assembled, insert the computer monitor into the RANMONMNT. If the computer has a removable swivel base you might have to remove it in order to fit it into the mount.
3. Mount the RANMONMNT into the rack at a height appropriate for working with the RANGER computer and so that the front-panel switches and floppy drive of the computer are accessible. Seek advice from the System Operators as to the location of the RANPCSW, since this is their work location. Proper location will greatly affect the Operators' attitude toward the system. The Media Center computer, monitor, and keyboard need not be located in the rack: a desk or computer workstation is appropriate. Just be sure the operators can easily view the system monitors from the selected locations.
4. Insert the computer into the RANPCMNT and secure it with the supplied straps.
5. Mount the RANPCMNT into the rack.
6. Connect the power cords to the monitor and computer.
7. Connect the VGA monitor interface cable to the computer's "VIDEO" port.

Configuring and Wiring the RANPCSW's RAN232 Card

Note: *Discharge static electricity from your clothes or body before handling the RAN232 card. Touch a metal surface to ground yourself or use a grounding strap.*

1. If you have not already done so, mount the RANCC16 into the rack.
2. If it is not already off, remove the front panel of the RANCC16 by loosening the four small thumbscrews.
3. Set the DIP switches on the RAN232 Card to the appropriate settings for the RANPCSW.

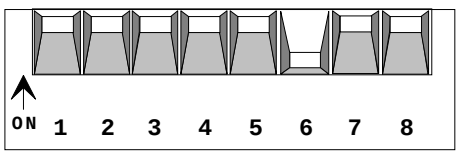


Figure 28. RAN232 S1 DIP Switch Settings

Note: *You must use RANCC16 (#1) slot 16.*

4. Slide the RAN232 card into slot 16 between the upper and lower white guides on the RANCC16 until it snaps into place.
5. If you will not be installing additional cards, replace the front panel of the RANCC16.
6. Connect the (VW2393-1) interface cable to from the RANPCSW computer's Com 2 port (Serial/Com 2). Connect the other end to the RANCC16's "MC1" RS232 port, which is located on the left-hand side of the back of the unit.
7. Connect the (VW2379) interface cable's DB9 connector to the RANPCSW computer's Com 1 port (Serial/Com 1). Connect the stripped ends of the cable into the top eight pins of the RAN232 card's connector (supplied with the RAN232) that is located in slot 16. You will find this connector on the back of RANCC16 card cage. Each connector is labeled with the slot number to which it corresponds.

RANSYNCR Sync Pulse Camera

The RANSYNCR is a black-and-white camera which produces a sync pulse that is needed to keep the RANGER system's video output in sync when no resource is assigned to a classroom monitor. It mounts on the side of one of the media center equipment racks and requires a 24 VAC power supply.

Parts Required

1 VP0266 (24 VAC power supply)

2 BNC-to-Phono 75 Ω video cables (refer to drawing VW2376)

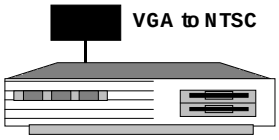
Associated Equipment

1 Three-conductor wire to interconnect the VP0266 to RANSYNCR

Installation

1. Connect the three-conductor wire between the VP0266 (24 VAC) and the RANSYNCR camera terminals labeled 24 VAC and GND. This will provide the camera with power.
2. Mount the RANSYNCR on the side of the rack.
3. Connect a BNC-to-BNC cable from the RANSYNCR's "Video Out" connector to "Input 0" (or whatever input you have designated as your "null video input" in your Mediapc.ini file on the Video Matrix Switch. See the RAN[*xx*]VS[*yy*] section for more information).
4. Connect the VP0266 to a power strip (e.g., RAC900). The RANSYCNCR's red "Power" LED should light.

RANMENU Character Generator



RANMENU uses an IBM compatible PC to generate and display classroom TV menus for the RANGER system. A PC running RANMENU software interprets live serial data fed from a RAN232 Serial Control Card housed in the RANCC16 Control Card Cage. The data is formatted and sent to the computer VGA video output where it is converted to a composite NTSC signal via a VGA/NTSC scan converter. The video output is then

redirected through the method used for video distribution. The RANMENU is comprised of software, interface cable, and a VGA/NTSC converter. Rauland-Borg does not supply a computer. The RANMENU software requires an 8088 or better computer capable of displaying VGA color graphics. The computer requires a license for DOS 3.3 or better, a floppy drive, VGA video (either on the motherboard or on an ISA card), and an RS232 port. No monitor, keyboard, or hard drive is required.

Parts Required

1 RANAVMS2 Audio/Video Multiplexer Module

1 Phono-to-Phono 75 Ω video cable (refer to drawing VW2385)

1 Phono-to-BNC 75 Ω video cable (refer to drawing VW2376)

1 Interface serial-port cable (refer to drawing VW2353)

Associated Equipment

1 RAN232 Serial Control Card (see "RAN232" for more information)

1 RANCC16 Control Card Cage (see "RANCC16" for more information)

Installation

1. Mount the PC used as the RANMENU on a RANSHELF or other mount.
2. Attach the RGB video cable to the Video connector on the PC, and the other end to the NTSC-to-VGA converter box.
3. Attach an RCA-to-RCA cable (refer to drawing VW2385) between the "NTSC" output on the converter and the "video" input on the RANAVMS2.
4. Attach an RCA-to-BNC cable (refer to drawing VW2376) between the "Mux" output on the RANAVMS2 and the appropriate input on the video matrix switch.
5. If the PC does not have a hard disk with DOS on it, follow the directions on the RANMENU software disk for making the disk bootable.
6. Put the RANMENU floppy disk into the floppy drive of the PC.
7. Attach the interface serial cable (refer to drawing VW2353) between the appropriate RAN232 and Com 1 on the PC.
8. Set up the Titler database for the correct video matrix switch input and RAN232 slot number.
9. Set the RAN232 dip switches as follows:

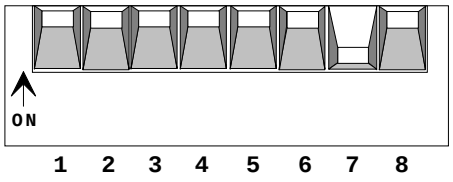


Figure 29. RAN232 S1 DIP Switch Settings

A

Appendix

Rauland RANGER® Headend Cable Summary

R-B Part Number	Cable Description	Cable Terminations
VW2290-372	RCA Triple- Audio	3 cables with RCA type (male) plugs at each end
VW2292	RANCC16 to Pioneer Laser	8 pin block connector to DB-9 (male) connector
VW2293-1	RANCC16 to PCINTF	2- 8 pin block connectors to DB-9 (female) connector
VW2295	RANCC16 to Utah Scientific	4 pin block connector to DB-9 (male) connector
VW2302	RANPCSW to RANCPU	DB-9 (female) connector to DB-9 (female) connector
VW2353	RANCC16 to RANTITLER- Amiga	8 pin block connector to DB-25 (female) connector
VW2374	RANCC16 to Switch (AVS-1B)	8 pin block connector to DB-25 (male) connector
VW2375	BNC- 75 Ohm Coaxial	BNC (male) connector to BNC (male) connector
VW2376	BNC/RCA- 75 Ohm Coaxial	BNC (male) connector to RCA type (male) plug
VW2377	RCA Single- 75 Ohm Coaxial	RCA type (male)plug to RCA type (male) plug
VW2378	RANCC16 (slot 16) to PCINTF	2- 8 pin block connectors to DB-9 (female) connector
VW2379	RANPCSW to RANCPU (MCI)	DB-9 (female) connector to DB-9 (female) connector
VW2385	RCA Single- Audio	RCA type (male) plug to RCA type (male) plug
VW2395	RANCC16 to AUTOPATCH (Switch)	8 pin block connector to DB-9 (female connector)