GE Medical Systems

Technical Publications

2208862-100

Revision 2

15" and 20" DISTAR-M MONITORS sm Service Manual

do not duplicate

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ATTENTION

LES APPAREILS À RAYONS X SONT DANGEREUX À LA FOIS POUR LE PATIENT ET POUR LE MANIPULATEUR SI LES MESURES DE PROTECTION NE SONT PAS STRICTEMENT APPLIQUEES

Bien que cet appareil soit construit selon les normes de sécurité les plus sévères, la source de rayonnement X représente un danger lorsque le manipulateur est non qualifié ou non averti. Une exposition excessive au rayonnement X entraîne des dommages à l'organisme.

Par conséquent, toutes les précautions doivent être prises pour éviter que les personnes non autorisées ou non qualifiées utilisent cet appareil créant ainsi un danger pour les autres et pour elles-mêmes.

Avant chaque manipulation, les personnes qualifiées et autorisées à se servir de cet appareil doivent se renseigner sur les mesures de protection établies par la Commission Internationale de la Protection Radiologique, Annales 26: Recommandations de la Commission Internationale sur la Protection Radiologique et les normes nationales en vigueur.

WARNING

X-RAY EQUIPMENT IS DANGEROUS TO BOTH PATIENT AND OPERATOR UNLESS MEASURES OF PROTECTION ARE STRICTLY OBSERVED

Thought this equipment is built to the highest standards of electrical and mechanical safety, the useful x-ray beam becomes a source of danger in the hands of the unauthorized or unqualified operator. Excessive exposure to x-radiation causes damage to human tissue.

Therefore, adequate precautions must be taken to prevent unauthorized or unqualified persons from operating this equipment exposing themselves or others to it's radiation.

Before operation, persons qualified and authorized to operate this equipment should be familiar with the Recommendations of the International Commission on Radiological Protection, contained in Annals Number 26 of the ICRP, and with applicable national standards.

ATENCION

LOS APARATOS DE RAYONS X SON PELIGROSOS PARA EL PACIENTE Y EL MANIPULADOR CUANDO LAS NORMAS DE PROTECCION NO ESTAN OBSERVADAS

Aunque este aparado está construido según las normas de seguridad más estrictas, la radiación X constituye un peligro al ser manipulado por personas no autorizadas o incompetentes. Una exposición excesiva a la radiación X puede causar daños al organismo.

Por consiguiente, se deberán tomar todas las precauciones necesarias para evitar que las personas incompetentes o no autorizadas utilicen este aparato, lo que sería un peligro para los demás y para si mismas.

Antes de efectuar las manipulaciones, las personas habilitadas y competentes en el uso de este aparato, deberán informarse sobre las normas de protección fijadas por la Comisión Internacional de la Protección Radiólogica, Anales No 26: Recomendaciónes de la Comisión Internacional sobre la Protección Radiológica y normas nacionales.

ACHTUNG

RÖNTGENAPPARATE SIND EINE GEFAHR FÜR PATIENTEN SOWIE BEDIENUNGSPERSONAL, WENN DIE GELTENDEN SICHERHEITSVORKEHRUNGEN NICHT GENAU BEACHTET WERDEN

Dieser Apparat entspricht in seiner Bauweise strengsten elektrischen und mechanischen Sichereitsnormen, doch in den Händen unbefugter oder unqualifizierter Personen wird er zu einer Gefahrenquelle. Übermäßige Röntgenbestrahlung ist für den menschlichen Organismus schädlich.

Deswegen sind hinreichende Vorsichtsmaßnahmen erforderlich, um zu verhindern, daßunbefugte oder unqualifizierte Personen solche Geräte bedienen oder sich selbst und andere Personen deren Bestrahlung aussetzen können.

Vor Inbetriebnahme dieses Apparats sollte sich das qualifizierte und befugte Bedienungspersonal mit den geltenden Kriterien für den gefahrlosen Strahleneinsatz durch sorgfältiges Studium des Hefts Nr. 26 der Internationalen Kommission für Strahlenschutz (ICRP) vertraut machen: Empfehlungen der Internationalen Kommission für Strahlenschutz und anderer nationaler Normenbehörden.

Regulatory Requirements

This equipment generates, uses, and can radiate radio frequency energy. The equipment may cause radio frequency interference to other medical and non-medical devices and radio communications. To provide reasonable protection against such interference, this product complies with emission limits for Group 1 Class A Medical Devices as stated in EN 60601–1–2.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment is found to cause interference (which may be determined by switching the equipment on and off), the user (or qualified service personnel) should attempt to correct the problem using one or more of the following measures:

- ❑ Reorientate or relocate the affected device(s).
- ❑ Increase the separating space between the equipment and the affected device.
- ❑ Power the equipment from a source different from that of the affected device.
- ❑ Consult the point of purchase or the service representative for further suggestions.

The manufacturer is not responsible for any interference caused either by the use of interconnect cables other than those recommended or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

To comply with the regulations applicable to an electromagnetic interface for a Group 1 Class A Medical Device, all interconnect cables to peripheral devices must be shielded and properly grounded. Use of cables not properly shielded and grounded may result in the equipment causing radio frequency interference in violation of the European Union Medical Device directive and FCC regulations.

This product complies with the standards requirements of the following:

- ❑ Medical Device Good Manufacturing Practice Manual issued by the FDA (Food and Drug Administration, Department of Health, USA).
- ❑ Underwriters' Laboratories, Inc. (UL), an independent testing laboratory.
- ❑ Canadian Standards Association (CSA).
- ❑ International Electrotechnical Commission (IEC), international standards organization.

General Electric Medical System is ISO 9001 certified.

WARNING

- THIS SERVICE MANUAL IS AVAILABLE IN ENGLISH ONLY.
- IF A CUSTOMER'S SERVICE PROVIDER REQUIRES A LANGUAGE OTHER THAN ENGLISH, IT IS THE CUSTOMER'S RESPONSIBILITY TO PROVIDE TRANSLATION SERVICES.
- DO NOT ATTEMPT TO SERVICE THE EQUIPMENT UNLESS THIS SERVICE MANUAL HAS BEEN CONSULTED AND IS UNDERSTOOD.
- FAILURE TO HEED THIS WARNING MAY RESULT IN IN JURY TO THE SERVICE PROVIDER, OPERATOR OR PATIENT FROM ELECTRIC SHOCK, MECHAMCAL OR OTHER HAZARDS.

ADVERTISSEMENT

- CE MANUEL DE MAINTENANCE N'EST DISPONIBLE QU'EN ANGLAIS.
- SI LE TECHNICIEN DU CLIENT A BESOIN DE CE MANUEL DANS UNE AUTRE LANGUE QUE L'ANGLAIS, C'EST AU CLIENT QU'IL INCOMBE DE LE FAIRE TRADUIRE.
- NE PAS TENTER D'INTERVENTION SUR LES ÉQUIPEMENTS TANT QUE LE MANUEL SERVICE N'A PAS ÉTÉ CONSULTÉ ET COMPRIS.
- LE NON-RESPECT DE CET AVERTISSEMENT PEUT ENTRAÎNER CHEZ LE TECHNICIEN, L'OPÉRATEUR OU LE PATIENT DES BLESSURES DUES À DES DANGERS ÉLECTRIQUES, MÉCAMQUES OU AUTRES.

WARNUNG

- DIESES KUNDENDIENST-HANDBUCH EXISTIERT NUR IN ENGLISCHER SPRACHE.
- FALLS EIN FR1MDER KUNDENDIENST EINE ANDERE SPRACHE BENÖTIGT, IST ES AUFGABE DES KUNDEN FÜR EINE ENTSPRECHKNDE ÜBERSETZUNG ZU SORGEN.
- VERSUCHEN SIE NICHT, DAS GERÄT ZU REPARIEREN, BEVOR DIESES KUNDENDIENST-HANDBUCH NICHT ZU RATE GEZOGEN UND VERSTANDEN WURDE.
- WIRD DIESE WARNUNG NICHT BEACHTET, SO KANN ES ZU VERLETZUNGEN DES KUNDENDIENSTTECHNIKERS, DES BEDIENERS ODER DES PATIENTEN DURCH ELEKTRISCHE SCHLÄGE, MECHANISCHE ODER SONSTIGE GEFAHREN KOMMEN.

AVISO

- ESTE MANUAL DE SERVICIO SÓLO EXISTE EN INGLÉS.
- SI ALGÚN PROVEEDOR DE SERVICIOS AJENO A GEMS SOLICITA UN IDIOMA QUE NO SEA EL INGLÉS, ES RESPONSABILIDAD DEL CLIENTE OFRECER UN SERVICIO DE TRADUCCIÓN.
- NO SE DEBERÁ DAR SERVICIO TÉCNICO AL EQUIPO, SIN HABER CONSULTADO Y COMPRENDIDO ESTE MANUAL DE SERVICIO.
- LA NO OBSERVANCIA DEL PRESENTE AVISO PUEDE DAR LUGAR A QUE EL PROVEEDOR DE SERVICIOS, EL OPERADOR O EL PACIENTE SUFRAN LESIONES PROVOCADAS POR CAUSAS ELÉCTRICAS, MECÁNICAS O DE OTRA NATURALEZA.

ATENÇÃO

- **ESTE MANUAL DE ASSISTÊNCIA TÉCNICA SÓ SE ENCONTRA DISPONÍVEL EM INGLÊS.**
- **SE QUALQUER OUTRO SERVIÇO DE ASSISTÊNCIA TÉCNICA, QUE NÃO A GEMS, SOLICITAR ESTES MANUAIS NOUTRO IDIOMA, É DA RESPONSABILIDADE DO CLIENTE FORNECER OS SERVIÇOS DE TRADUÇÃO.**
- **NÃO TENTE REPARAR O EQUIPAMENTO SEM TER CONSULTADO E COMPREENDIDO ESTE MANUAL DE ASSISTÊNCIA TÉCNICA.**
- **O NÃO CUMP NTO DESTE AVISO PODE POR EM PERIGO A SEGURANÇA DO TÉCNICO, OPERADOR OU PACIENTE DEVIDO A' CHOQUES ELÉTRICOS, MECÂNICOS OU OUTROS.**

AVVERTENZA

- **IL PRESENTE MANUALE DI MANUTENZIONE È DISPONIBILE SOLTANTO IN INGLESE.**
- **SE UN ADDETTO ALLA MANUTENZIONE ESTERNO ALLA GEMS RICHIEDE IL MANUALE IN UNA LINGUA DIVERSA, IL CLIENTE È TENUTO A PROVVEDERE DIRETTAMENTE ALLA TRADUZIONE.**
- **SI PROCEDA ALLA MANUTENZIONE DELL'APPARECCHIATURA SOLO DOPO AVER CONSULTATO IL PRESENTE MANUALE ED AVERNE COMPRESO IL CONTENUTO.**
- **NON TENERE CONTO DELLA PRESENTE AVVERTENZA POTREBBE FAR COMPIERE OPERAZIONI DA CUI DERIVINO LESIONI ALL'ADDETTO ALLA MANUTENZIONE, ALL'UTILIZZATORE ED AL PAZIENTE PER FOLGORAZIONE ELETTRICA, PER URTI MECCANICI OD ALTRI RISCHI.**

警告

- このサービスマニュアルには英語版しかありません。
- ＧＥＭＳ以外でサービスを担当される業者が英語以外の言語を要求される場合、翻訳作業はその業者の責任で行うものとさせていただきます。
- このサービスマニュアルを熟読し理解せずに、装置のサービスを行わないで下さい。
- この警告に従わない場合、サービスを担当される方、操作員あるいは患者さんが、感電や機械的又はその他の危険により負傷する可能性があります。

注意:

- **本维修手册仅存有英文本・**
- **非 GEMS 公司的维修员要求非英文本的维修手册时，客户需自行负责翻译・**
- **未详细阅读和完全了解本手册之前，不得进行维修・**
- **忽略本注意事项会对维修员，操作员或病人造成触电，机械伤害或其他伤害・**

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SYMBOLS

	CAUTION Consult accompanying document
	Dangerous Voltage
	Model B
	Protection ground
	Alternating voltage
	Contrast
	Brightness

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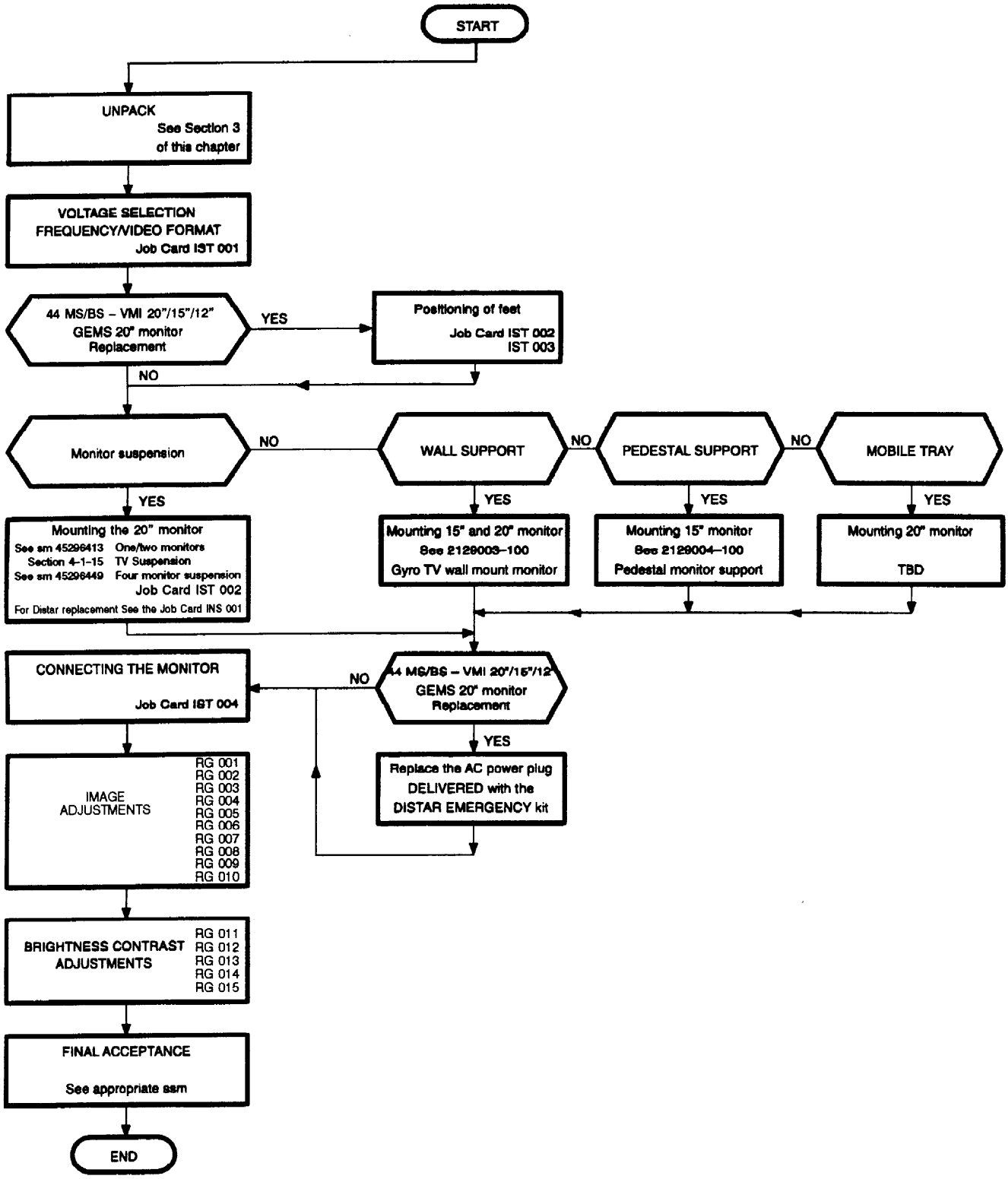
SECTION 2
INSTALLATION STEERING



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REVISION HISTORY

REV	DATE	REASON FOR CHANGE
0	March 5, 1998	Initial release.
1	April 3, 1998	LLR ROT Procedure
2	May 11, 1998	FFD and FFD ROT Procedure

NOTES

CHAPTER 1 - OPERATING INSTRUCTION

SECTION 1
SAFETY - WARNINGS AND CAUTIONS

KNOW THE EQUIPMENT

Be aware of safety when you service this Video Monitor. The following WARNINGs refer to conditions that may results in physical injury.

WARNING

ELECTRIC SHOCK HAZARD!!
THIS VIDEO MONITOR OPERATES AT DANGEROUS VOLTAGE LEVELS! DISCONNECT POWER FOR ALL PROCEDURES THAT DO NOT NEED POWER TO THE UNIT.
ALL SAFETY PRECAUTIONS NORMALLY FOLLOWED IN USING AND TESTING ELECTRONIC EQUIPMENT MUST BE FOLLOWED, DURING PROCEDURES THAT NEED POWER TO THE UNIT.

WARNING

ELECTRIC SHOCK HAZARD!!
DISCONNECT POWER, DISCHARGE THE CRT, AND HIGH VOLTAGE ASSEMBLY BEFORE REMOVING ANY COMPONENTS.

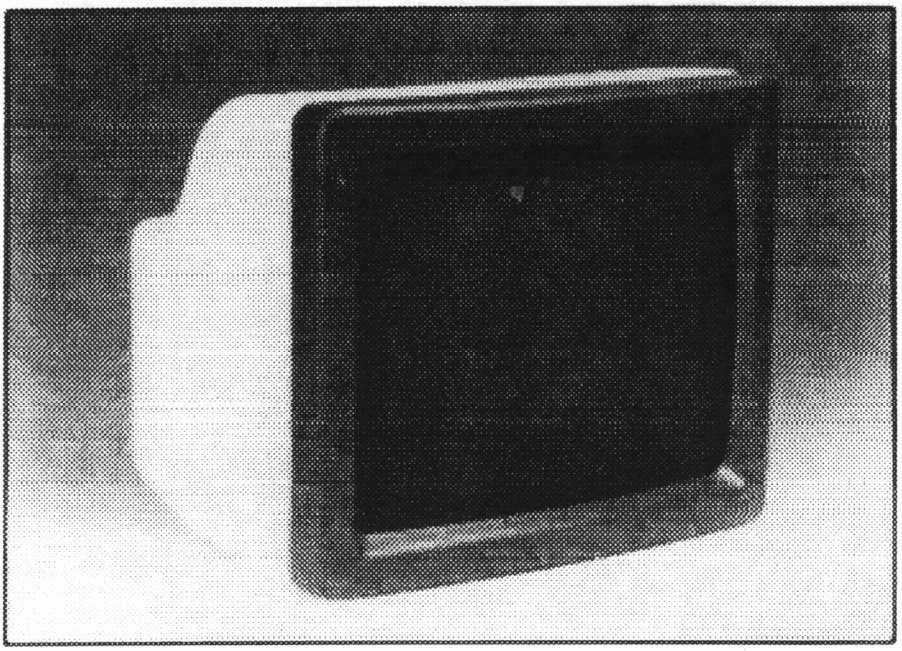
WARNING

X-RADIATION HAZARD!!
THIS PRODUCT CONTAINS CRITICAL COMPONENTS. THESE COMPONENTS MUST BE REPLACED WITH EXACT DUPLICATE PARTS ONLY.
FAILURE TO OBSERVE THIS PRECAUTION CAN RESULT IN EMISSION OF X-RADIATION.
ADJUSTMENTS OF THE HIGH VOLTAGE POWER SUPPLY MUST NOT BE ATTEMPTED OR MADE. THESE ARE FACTORY ADJUSTMENTS ONLY!

WARNING

AVOID IN JURY!!
AVOID STRIKING OR SCRATCHING THE HIGH VACUUM CATHODE RAY TUBE, ESPECIALLY ON THE NECK AND SCREEN AREAS. MISHANDLING MAY RESULT IN A SUDDEN AND VIOLENT CATHODE RAY TUBE IMPLOSION.

SECTION 2
PRODUCT IDENTIFICATION



Ill. 1 - DISTAR-M

TYPE	GEMS Model P/N	MAGNETEK Model P/N
15 DLR CHARCOAL GRAY	2153977	146615100
15 DLR MIST GRAY	2153978	147015100
20 DLR CHARCOAL GRAY	2153976	146420100
20 LLR ROT CHARCOAL GRAY	2211178	148020100
20 FFD CHARCOAR GRAY	2153979	146020100
20 FFD ROT CHARCOAL GRAY	2153980	146520100

TAB. I

SECTION 3
OPERATOR CONTROLS

ILLUSTRATION 2
FRONT VIEW

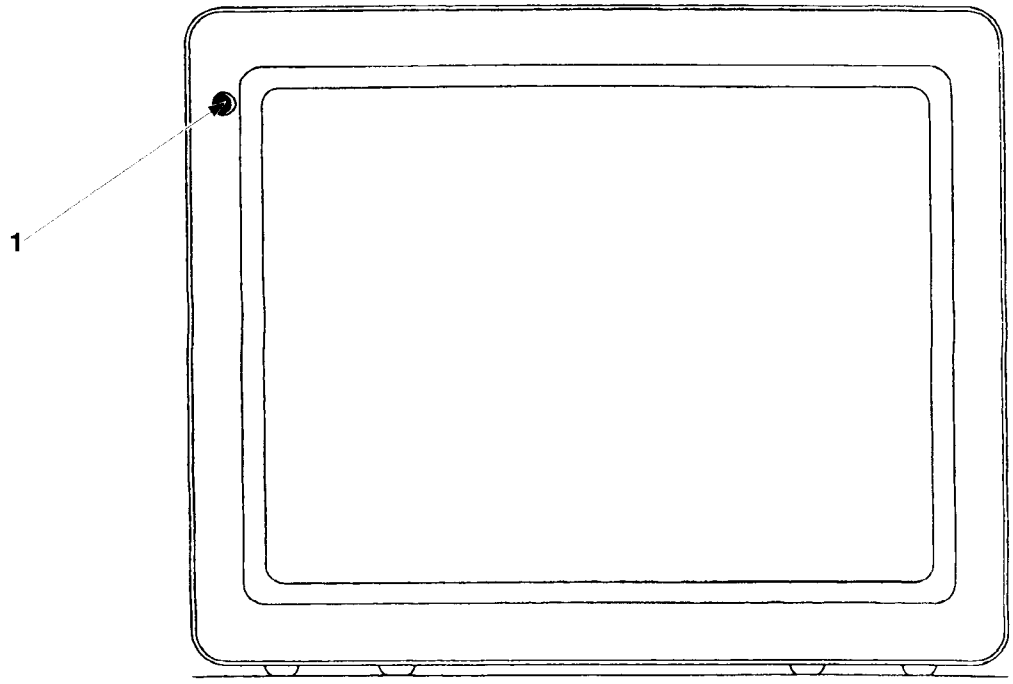
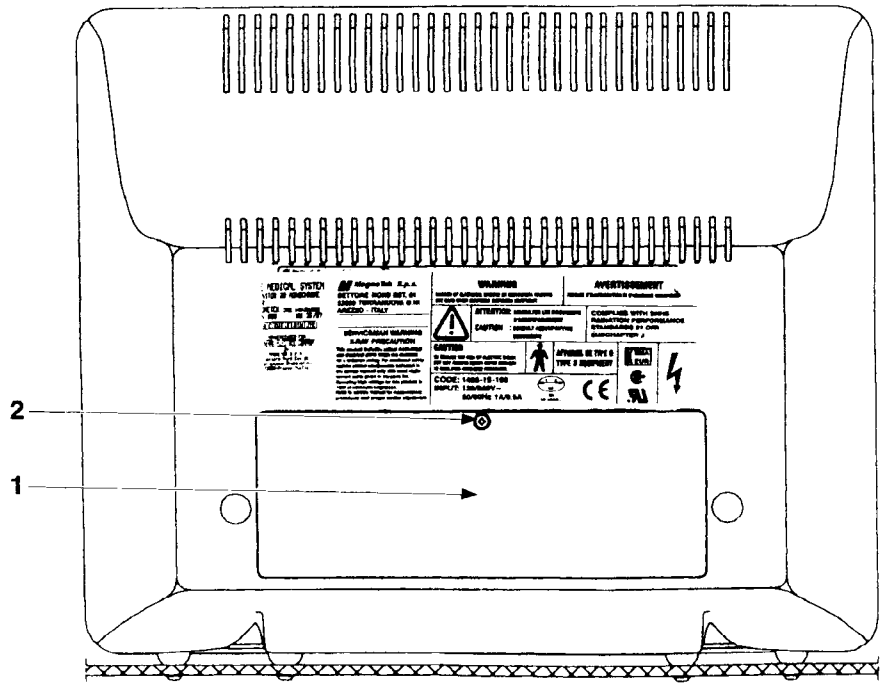


ILLUSTRATION 3
REAR VIEW



The BRIGHTNESS and CONTRAST controls are located under a door, on the back of the Monitor, which is screwed to the enclosure: only GEMS trained technicians may adjust them.

The controls have been preset when the monitor was installed and should not need to be changed: a light sensor located on the front of the monitor adjusts the brightness and contrast of the image automatically, according to the ambient light (Ill. 1, Item 1).

SECTION 4
CLEANING THE SCREEN

Dust, dirt and other contaminants that collect on the Video Monitor screen degrade picture quality. This material should be removed weekly, or as needed. Do not wax screen surface.

1. Disconnect Video Monitor power.

WARNING

ELECTRIC SHOCK HAZARD!!
DO NOT SPRAY OR APPLY GLASS CLEANER DIRECTLY TO THE MONITOR.
EXCESS WILL FLOW BETWEEN SCREEN AND CRT MASK, POSSIBLY CONTACTING LIVE COMPONENTS.

2. Dampen (do not saturate) a clean, lint free cloth with liquid glass cleaner.
3. Clean Video Monitor screen with the cloth using circular motions to avoid streaks.

SECTION 5
CLEANING THE ENCLOSURE

1. Disconnect Video Monitor power.

CAUTION

FINISH DAMAGE!

Do not use cleaners or solvents; they may dull the finish or blur the lettering.

Do not use wax containing a cleaning substance.

2. Using warm water with mild soap, slightly moisten a clean lint free cloth and clean Video Monitor enclosure, trim, and Operator's Controls.
3. Wipe with a clean cloth slightly moistened in clean clear water.
4. Polish with PURE liquid or paste wax.

SECTION 6
SPECIFICATION

6.1 PHISICAL CHARACTERISTICS

	20" DLR	15" DLR	20" LLR ROT	20" FFD	20" FFD ROT
Weight	21,7 Kg (48,6 lb)	15,2 Kg (34,05 lb)	22,2 Kg (49,72 lb)	21,6 Kg (48,3 lb)	22,15 Kg (49,6 lb)
Width	460 mm (18.11 in)	370 mm (14,57 in)	460 mm (18,11 in)	460 mm (18,11 in)	460 mm (18,11 in)
Height	379 mm (14.92 in)	312,5 mm (12,34 in)	379 mm (14,92 in)	379 mm (14,92 in)	379 mm (14,92 in)
Depth	382 mm (15.03 in)	365 mm (14,37 in)	382 mm (15,03 in)	382 mm (15,03 in)	382 mm (15,03 in)

TAB II

6.2 POWER INPUT

The monitor are a full range input of voltages:

- 90V to 264V
- 50/60 Hz
- 70 W

6.3 VIDEO INPUT

The monitor is set to a nominal 1V signal (0.7V video amplitude, 0.05V set-up level, 0.3V Syncro). As normally adjusted, a signal with video amplitude up to 1V can be accepted without detriment to the dispaly, provided that the overload white level signal does not occur over more than 30% of image area.

A higher video signal (up to 1.8V), can be accepted by adjustment of the CONTRAST CONTROL.

In all applications the video signal must be terminated by 75 ohm load (normally plugged into the OUT connector; for chained monitors only the last monitor in the chain terminated).

6.4 ENVIRONMENTAL CONDITIONS

The monitor will maintain its perfomance under the following contions:

	DLR MODEL	*FFD MODEL*
- Temperature:	+5° to +50°C	+5° to +45°C
- Relative Humidity:	<95% non-condensing	<95% non-condensing
- Atmospheric Pressure:	700 to 1060 HPa	700 to 1060 HPa
- Storage Temperature:	-40° to +70°C	-40° to +70°C

6.5 REGULATIONS

- The monitor complies with the standard and regulation requirements of the following:
- Underwriters' Laboratories, Inc. (UL), an indipendent testing laboratory following (UL 478).
- Canadian Standards Association (CSA)
- International Electrotechnical Commission (IEC), international standards organization
  - IEC 601-1-2- (EMC),
  - IEC 601-1
- 21 CFR para. 1020.10 (ionizing leakage radiation).

SECTION 3
INTRODUCTION

Before starting: for obvious shipping damage.

- Inspect for obvious shipping damage.
- Carefully examine all packing material for small parts. This may avoid short-age claims.
- Locate all the necessary manuals.
- Identify and label all cables used with the monitor and check their lengths against the system requirements.

WARNING

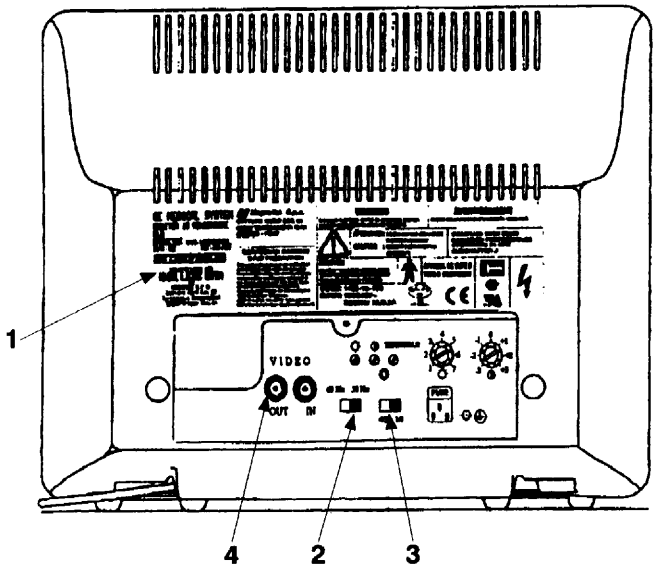
AVOID IN JURY!!
DO NOT STRIKE OR SCRATCH THE CATHODE RAY TUBE, ESPECIALLY ON THE NECK AND SCREEN AREAS. MISHANDLING MAY RESULT IN A SUDDEN AND VIOLENT IMPLOSION.

SECTION 4
PRODUCTION IDENTIFICATION

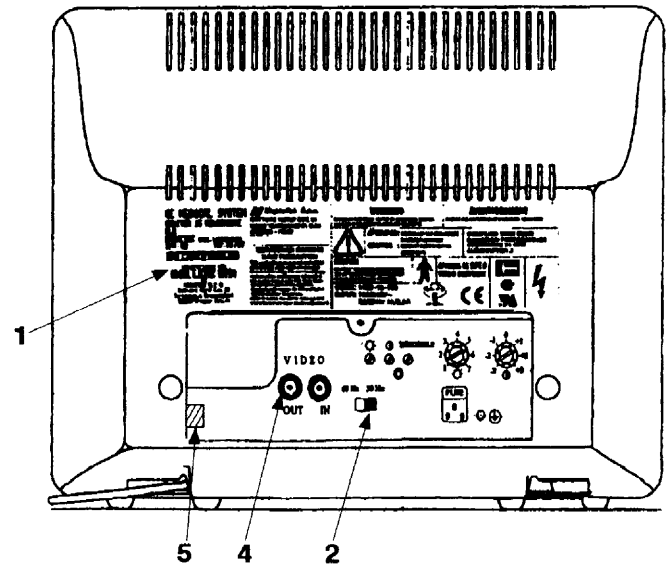
Model numbers are on a Rating Plate (Ill4-1, Item 1) located at the back of the Monitor and on the bottom of the chassis base.

To determine the model of the Monitor you are working with: refer to Chapter 1, TAB I.

ILLUSTRATION 4
REAR VIEW REAR DOOR REMOVED



DLR MODEL
LLR ROT MODEL



FFD ROT MODEL
FFD MODEL

15" and 20" DISTAR-M MONITORS Job Card IST 001 1 of 1

Purpose: **VOLTAGE SELECTION VIDEO FORMAT SELECTION**	Version No.: 1 Date: Mar/03/98
Time:	Personel: 1

SECTION 1
SUPPLIES REQUIRED

- None.

SECTION 2
TOOLS REQUIRED

- Standard tool case.

SECTION 3
SAFETY PRECAUTIONS

- Cut off the system power supply.

SECTION 4
PREREQUISITES

- None.

SECTION 5
TASK DESCRIPTION

- Remove the rear door (Ill. 3, Item 1), by removing the mounting screw (Ill. 3, Item 2).
- Check vertical frequency switch setting (Ill. 4, Item 2).
- Configure the monitor as required for the system used:
  - Check a 75 OHM terminal load is fitted on the monitor video out connector (Ill. 4, Item 4),
  - Correct video format, (Ill. 4, Item 3). For monitor LLR ROT this switch is fixed on 4/3 position. For monitor FFD and FFD ROT this switch is absent.

5.1 Voltage Selection

- Voltage selection does not need to be modified.
- The monitor works with a voltage power supply from 90V to 264V automatically.

15" and 20" DISTAR-M MONITORS Job Card IST 002

Purpose: **MOUNTING THE 20" MONITOR**	Version No.: 0 Date: Mar/03/98
Time:	Personnel: 1

SECTION 1
SUPPLIES REQUIRED

- None.

SECTION 2
TOOLS REQUIRED

- Standard tool case.

SECTION 3
SAFETY PRECAUTIONS

- Cut off the system power supply.

SECTION 4
PREREQUISITES

- None.

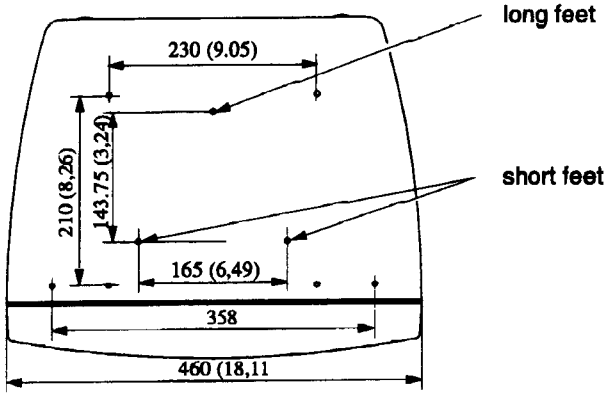
SECTION 5
TASK DESCRIPTION

- The monitor is supported and secured by feet (spacers) on the bottom panel. Positions provided for these feet are shown in Ill. 1. Monitors are shipped with four feet mounted in the positions indicated as "STANDARD SUSPENSION OR MOBILE CARTS".
- Refer to the SM 45296413 for the mounting on the TV monitor suspension (one/two monitors). Section 4–1–15.
- Refer to the SM 45296449 for the mounting on the four TV monitors suspension.
- Refer to the Preinstallation and Installation Manual 2129003–100 for the mounting on the wall mount monitor support.
- Install the monitor with screws provided in the Emergency Kit following the application (Ill. 5).

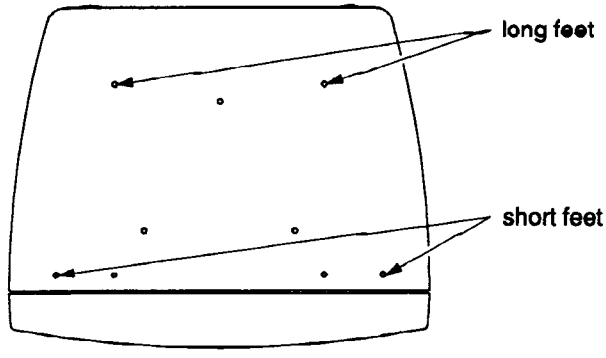
MOUNTING THE 20" MONITOR

Job Card IST 002

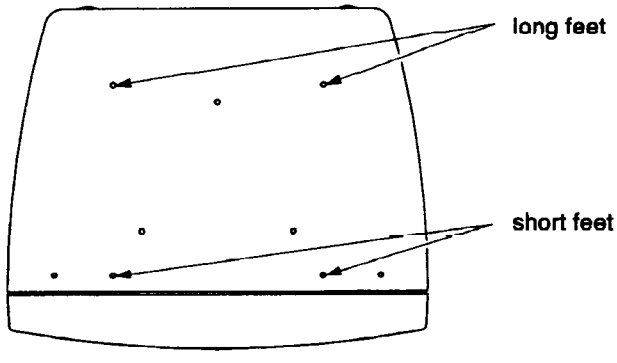
ILLUSTRATION 5
VIEW FROM ABOVE



VMI REPLACEMENT



STANDARD SUSPENSION OR MOBILE CARTS



MOBILE CART

Note:
- The attachment screw are contained in the emergency kit.
- Use the 4x8 mm screws for panel thicknesses 2 mm.
- Use the 4x10 mm screws for panel thicknesses exceeding 2 mm thru 4.0 mm.
- Use the 4x12 mm screws for panel thicknesses exceeding 4 mm thru 7 mm.

15" and 20" DISTAR-M MONITORS Job Card IST 003 1 of 2

Purpose: **MOUNTING THE 15" MONITOR**	Version No.: 0 Date: Mar/03/98
Time:	Personnel: 1

SECTION 1
SUPPLIES REQUIRED

- None.

SECTION 2
TOOLS REQUIRED

- Standard tool case.

SECTION 3
SAFETY PRECAUTIONS

- Cut off the system power supply.

SECTION 4
PREREQUISITES

- None.

SECTION 5
TASK DESCRIPTION

- The monitor is supported and secured by feet (spacers) on the bottom panel. Positions provided for these feet are shown in Ill. 6. Monitors are shipped with four feet mounted in the positions indicated as "standard model".
- Refer to the Preinstallation and Installation Manual for the mounting on the wall mount monitor support or on wall support.

CHAPTER 3 - PRESENTATION OF THE MONITOR

SECTION 1
DEFINITIONS LIST

FFD ROT	fliker free didisplay with yoke rotation
FFD	fliker free display
LLR ROT	low line rate with yoke rotation
DLR	dual line rate
HLR 1/1	high line rate
HLR 1,1/1	high line rate
LLR 4/3	low line rate
LLR 1,1/1	low line rate
CRT	catode ray tube
IC	integrated circuit

The GEMS monitors P/N 2153976, P/N 2153978 P/N2153977 and P/N 2211178* are able to represent the following modes:

	HLR 1/1	HLR 1,1/1	LLR 4/3 LLR ROT	LLR 4/3 LLR ROT	LLR 1,1/1	LLR 1,1/1
Composit video	X	X	X	X	X	X
Amplitude	1V	1V	1V	1V	1V	1V
Horizontal Sync.	31225 Hz	30690 Hz	15625 Hz	15750 Hz	15625 Hz	15750 Hz
Vertical Sync.	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz
Vertical Lines	1249	1023	625	525	625	525

*the monitor P/N 2211178 is able only for modes LLR 4/3

TAB I

The GEMS monitor P/N 2153979 and P/N 2153980 are able to present the following modes:

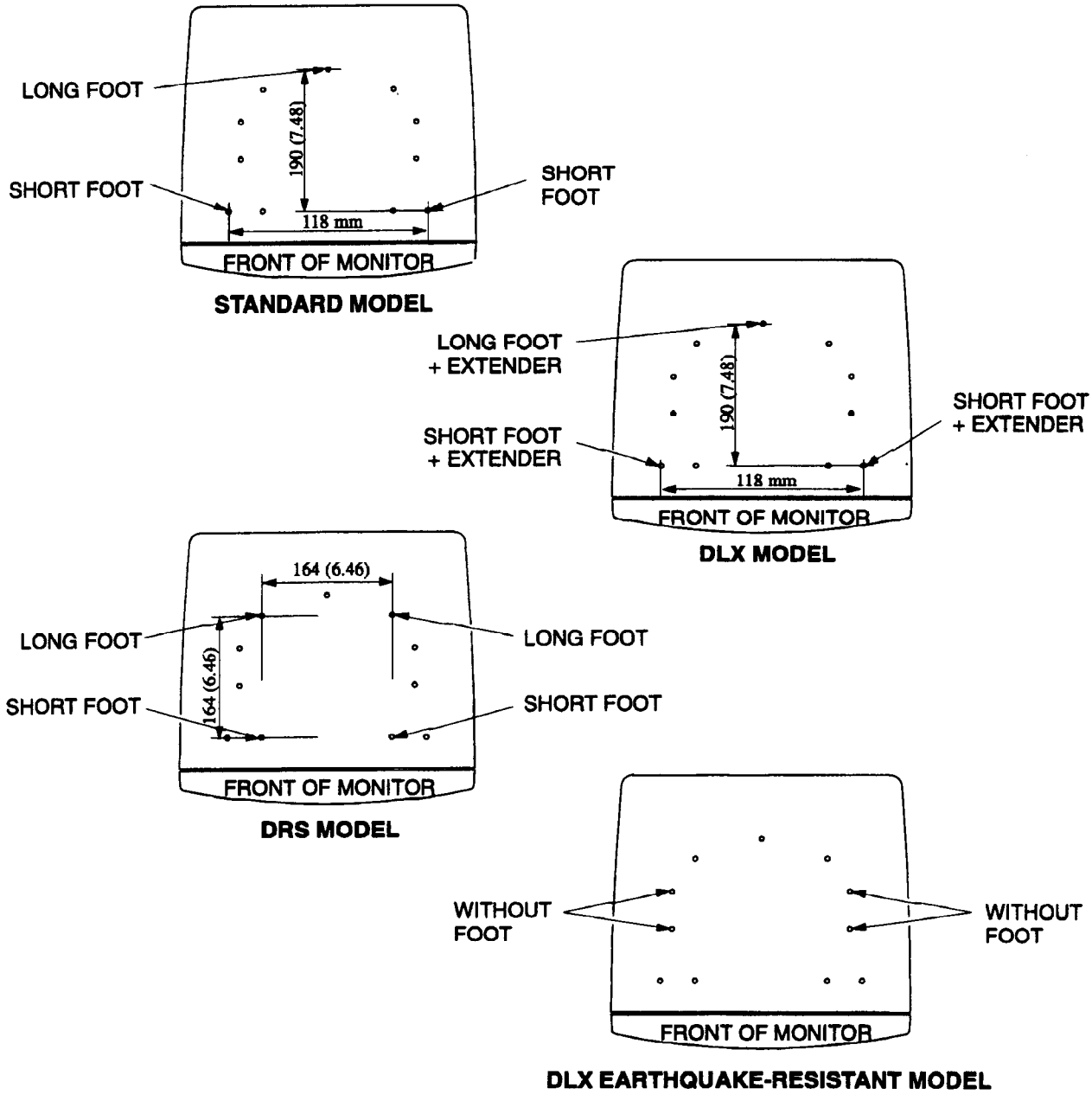
	FFD - FFD ROT	FFD - FFD ROT
Composit video	X	X
Amplitude	1V	1V
Horizontal Sync.	31250Hz	31500Hz
Vertical Sync.	100Hz	120Hz
Vertical Lines	625	525

MOUNTING THE 15" MONITOR

Job Card IST 003

2 of 2

ILLUSTRATION 6
VIEW FROM ABOVE



- Install the monitor with screws provided in the Emergency Kit following. Ill. above.

Note:
- The attachment screw are contained in the emergency kit.
- Use the 4x8 mm screws for panel thicknesses 2 mm.
- Use the 4x10 mm screws for panel thicknesses exceeding 2 mm thru 4.0 mm.
- Use the 4x12 mm screws for panel thicknesses exceeding 4 mm thru 7 mm.

15" and 20" DISTAR MONITORS Job Card IST 004

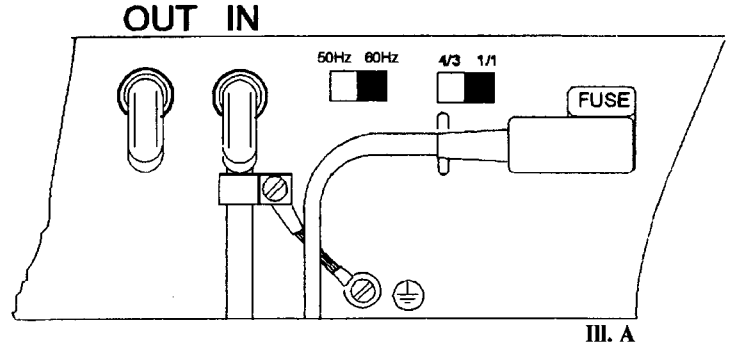
Purpose: **CONNECTING THE MONITOR**	Version No.: 0 Date: Mar/03/98
Time:	Personel: 1

SECTION 1
SUPPLIES REQUIRED

- None.

SECTION 2
TOOLS REQUIRED

- Standard tool case.



Ill. A

SECTION 3
SAFETY PRECAUTIONS

- Cut off the system power supply.

SECTION 4
PREREQUISITES

- None.

SECTION 5
TASK DESCRIPTION

- Remove the rear door (Job Card IST 001, Ill. 3, Item 1), by removing the mounting screw (Job Card IST 001, Ill. 3, Item 2).
- Connecting the cables to the monitor:
  See Ill. A for connection of power cord, video cables and ground wire at the rear of the monitor.
- See Ill. 4 item 5 for connection of rotation card.
- Connecting the cables to the system:
  The cables are connected differently for each system. For more detail:

  – Refer to the SSM manual for the connecting the DISTAR to the system,

  – Refer to Ill. 2 if the DISTAR is connected to a wall box (Advantx Room).

Note: A 75–Ω termination load is normally fitted on the monitor video OUT connector. When installing more than one Monitor in the same video path, only the last monitor must be terminated. Ensure that the load is fitted on the last monitor; remove the loads from the others (Ill. 4).

MONITOR SUSPENSION	Job Card INS 001	1 of 2

Purpose: **COUNTERPOISE ADJUSTMENT FOR MAGNETEK MONITOR MOUNTING**	Version No.: 0 Date: Mar/03/98
Time:	Personnel: 1

SECTION 1
SUPPLIES REQUIRED

- None.

SECTION 2
TOOLS REQUIRED

- Standard Engineering tools.

SECTION 3
SAFETY PRECAUTIONS

- Cut off the system power supply.

SECTION 4
PREREQUISITES

- This Job Card is to be performed when on a DISTAR/MAGNTETEK Monitor Suspension (balanced for a DISTAR Monitor type), you want to mount a MAGNETEK Monitor type.
- In case of Dual Monitor Suspensions, the adjustment procedure (page 2) refers to the balancing when both monitors are replaced.

MONITORS SUSPENSION — Job Card INS 001

SECTION 5
TASK DESCRIPTION

WARNING

STAY ON THE SIDE OF THE SPRING CYLINDER DURING THE ADJUSTMENT PROCEDURE.

5.1 Adjustment procedure (see Figure 1)

- Raise the monitor tray to the highest position.
- Remove the three M4 screws (1) of the cylinder cover (2) and remove the cover.
- Unscrew the M16 bolt (3) for as many turns as specified in the table hereafter with a 24mm wrench to equilibrate the monitors:

SUSPENSION MODEL	N° of TURNS
Single Monitor DISTAR (2122373)	2 and 1/4 (810°)
Dual Monitor DISTAR (2122372)	1
Dual New Monitor Frame (2128272)	1

For finer balancing, follow the criteria here below:

POSSIBLE CAUSES	ADJUSTMENTS
Units tends to drift down	Tighten counterpoise M16 (3 Figure 1) adjustment bolt
Units tends to drift up	Loosen counterpoise M16 (3 Figure 1) adjustment bolt

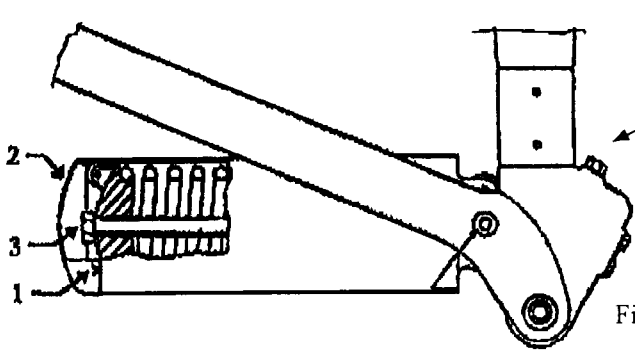


Figure 1

CAUTION

DO NOT ADJUST. FOR FACTORY SETTING ONLY.

5.2 Re-installing procedure

Procedure the cover and re-install the three screws.

RENEWABLE PART

TYPE	GEMS Model P/N	MAGNETEK Model P/N	Front Foot	Rear Foot	Extender Foot	Plastic Cover	Emergency Kit	Service Manual	Assistance Service Manual
15" DLR CHARCOAL GREY	2153977 FRU1	146615100 FRU1	2211429 FRU2	2211428 FRU2	X	2209978 FRU2	2209980 FRU2	2208862-100 FRU2	2208865-100 FRU2
15" DLR MIST GREY	2153978 FRU1	147015100 FRU1	2211429 FRU2	2211428 FRU2	2209983 FRU2	2209979 FRU2	2209980 FRU2	2208862-100 FRU2	2208865-100 FRU2
20" DLR CHARCOAL GREY	2153976 FRU1	146420100 FRU1	2211429 FRU2	2211428 FRU2	X	2209977 FRU2	2209980 FRU2	2208862-100 FRU2	2208865-100 FRU2
20" LLR ROT CHARCOAL GREY	2211178 FRU1	148020100 FRU1	2211429 FRU2	2211428 FRU2	X	2209977 FRU2	2214728 FRU2	2208862-100 FRU2	2208865-100 FRU2
20" FFD CHARCOAL GREY	2153979 FRU1	146020100 FRU1	2211429 FRU2	2211428 FRU2	X	2209977 FRU2	2214728 FRU2	2208862-100 FRU2	2208865-100 FRU2
20" FFD ROT CHARCOAL GREY	2153980 FRU1	146520100 FRU1	2211429 FRU2	2211428 FRU2	X	2209977 FRU2	2214728 FRU2	2208862-100 FRU2	2208865-100 FRU2

TAB I

FRU	FIELD REPLACEABLE UNIT
1	CRITICAL
2	NOT CRITICAL
N	NOT AVAIBLE

TAB II

LLR1,1/1	AUTOMATIC	HLR 1,1/1
LLR1,1/1	AUTOMATIC	HLR1/1
HLR1/1	MANUALY	LLR4/3 - LLR ROT
LLR1,1/1	MANUALY	LLR4/3 - LLR ROT
50Hz	MANUALY	60Hz
100Hz	MANUALY	120Hz

The power supply is full range between 90 Vac and 264 Vac with a frequency of 60Hz and 50Hz. The monitor uses 20" or 15" CRT with P104 phosphor and color coordinates x=0.28-+0.015 and y=0.304-+0.015. A filter (OCLI HEA) allowing a light transmission equal 60 % is applied on the CRT.

SECTION 2
EXTERNAL OPERATOR CONTROLS
AND CHARACTERISTICS

ILLUSTRATION 7
FRONT VIEW

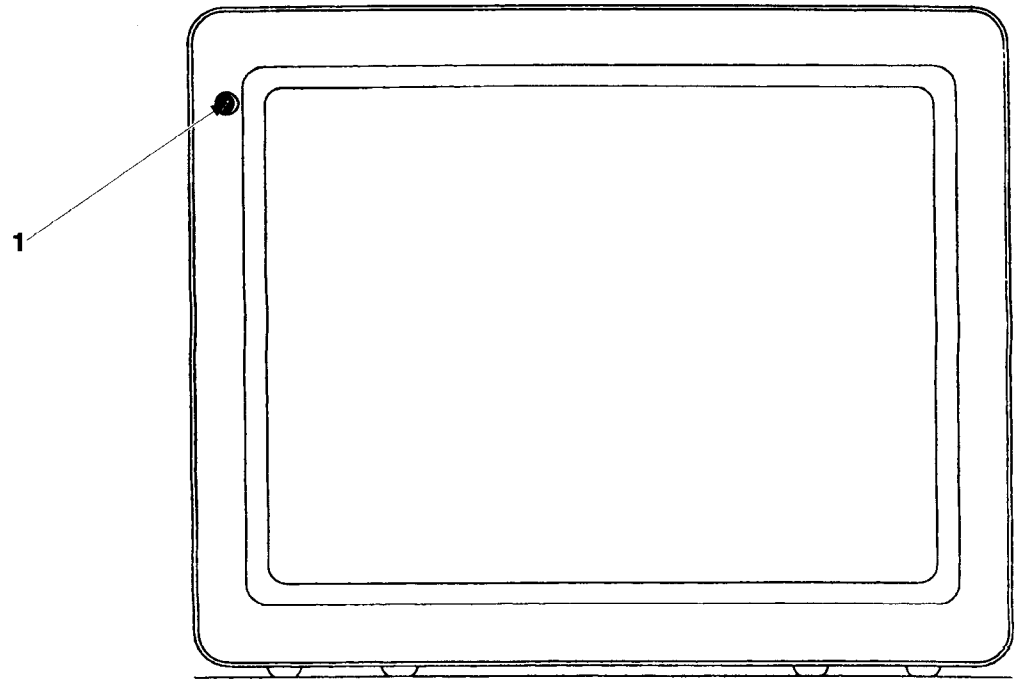
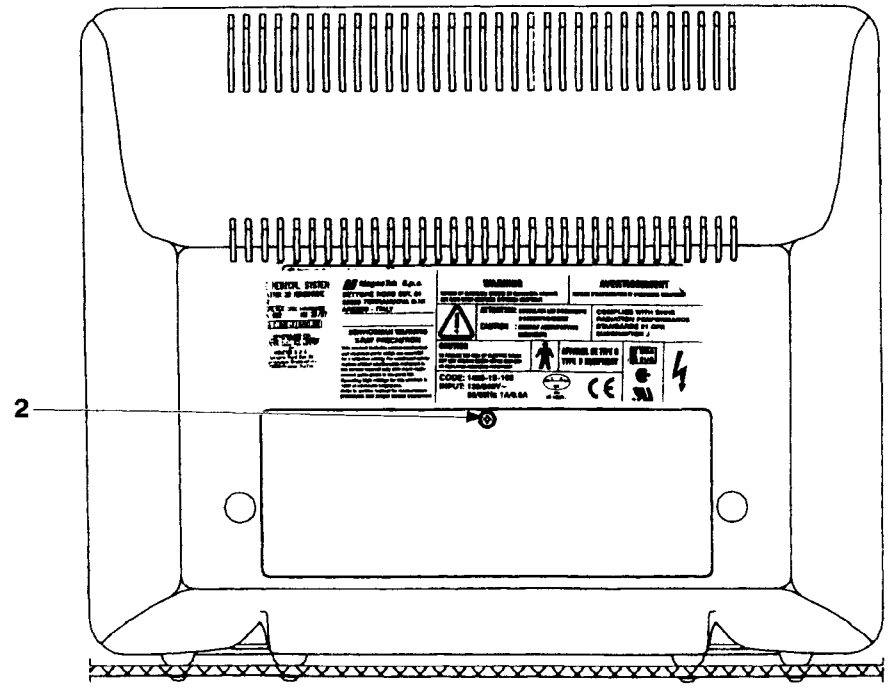


ILLUSTRATION 8
REAR VIEW



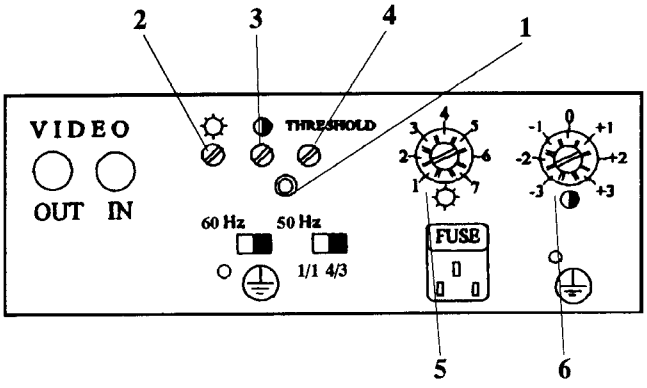
2.1 BRIGHTNESS AND CONTRAST

The brightness and contrast controls are under a door, behind the Monitor, wich is screwed to the enclosure (Ill. 8, Item 2).

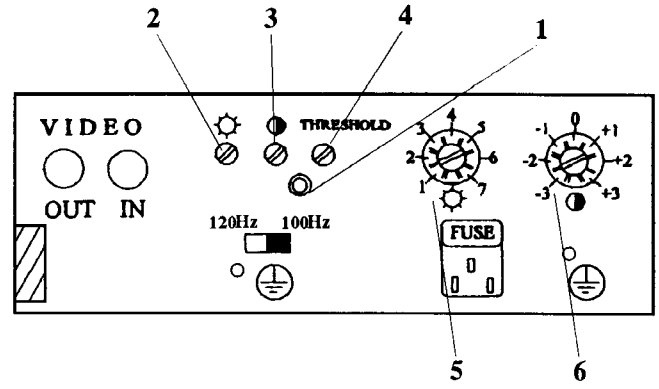
The controls have been preset when the monitor was installed and should not need tobe changed: a light sensor located on the front of the monitor (Ill. 7, Item 1) adjusts the brightness and contrast of the image automatically, according to the ambient light.

2.2 EXTERNAL CONTROLS

- Brightness control potentiometer: modifies the tube bias of the monitor.
  Tur it clock wise to illuminate the raster or increase the black level (Ill. 9, Item 5).
- Contrast control potentiometer: modifies the video gain.
  Turn it clockwise to increase the white level (Ill. 9, Item 6).
- The CEL threshold control set the threshold level of ambient light at which CEL becomes active.
  GREEN LED indicates whether CEL is active (Ill. 9, Item 1).
  Tur the CEL threshold control clockwise to increase the threshold level of ambient light. (Ill. 9, Item 4).
- CEL Brightness control: operates as the monitor brightness control when CEL is active.
  Clockwise to increase the brightness (Ill. 9, Item 2).
- CEL Contrast control: operates as the monitor contrast control when CEL is active.
  Clockwise to increase the contrast (Ill. 9, Item 3).



DLR MODEL



FFD MODEL - FFD ROT MODEL

Ill. 9 - Rear view of monitor with door

ITEM	FUNCTION
1	LED
2	CEL Brightness Control
3	CEL Contrast Control
4	CEL Threshold Control
5	Adj. Raster Brightness
6	Adj. Video Brightness

2.3 LIGHT ADJUSTMENT

MONITOR DLR

The bright monitor during the manufacturing is present how below:

- for ambient light level of darkroom (0 LUX)

- raster level/black level/50mV = 0.4 Cd/m^2 (raster brig.)
- video level/white level/700mV = 150 Cd/m^2 (video brig.)

CEL active (CEL GREEN LED ON) for an ambient light level slightly above 20 LUX.

- for an ambient light level of 50 LUX

- raster level/black level/50mV = 2 Cd/m^2 (raster brig.)
- video level/white level/700mV = 300 Cd/m^2 (video brig.)

CEL GREEN LED ON.

MONITOR FFD

The bright monitor during the manufacturing is present how below:

- for ambient light level of darkroom (0 LUX)

- raster level/black level/50mV = 0.4 Cd/m^2 (raster brig.)
- video level/withe level/700mV = 120 Cd/m^2 (video brig.)

CEL active (CEL GREEN LED ON) for an ambient light level slightly above 70 LUX.

- for an ambient light level of 200 LUX

- raster level/black level/50mV = 9 Cd/m^2 (raster brig.)
- video levele/withe level/700mV = 200 Cd/m^2 (video brig.)

CEL GREEN LED ON.

CHAPTER 4 - DESCRIPTION OF DISTAR-M MONITOR ADJUSTMENTS

The monitor are correctly adjusted for all video formats. If sometimes the adjuments is not correct, the following adjustments are possible.

Adjust the monitor with the global procedure Chp. 5 Sect. 1 or partial procedure Chp. 5 Sect. 2.

Remove the rear cover (Ill. 11, Item 4), by removing the mounting screw (Ill. 11, Item 3). For monitor 15" before remove the door (Ill. 11, Item 2).

DLR MONITOR ADJUSTMENTS

SECTION 1
ADJUSTMENTS ON L.V. POWER SUPPLY BOARD FOR DLR MONITOR (Ill. 12)

1.1 HORIZONTAL AMPLITUDE

HVIC horizontal amplitude adjustment for LLR 1,1/1 mode at 50Hz and 60Hz.

HLLR horizontal amplitude adjustment for LLR 4/3 mode at 50Hz and 60Hz.

HHLR horizontal amplitude adjustment for HLR 1,1/1 mode and HLR 1/1.

These trimmers can be adjusted on the left side of the monitor after removing the plastic cover.

SECTION 2
ADJUSTMENTS ON DEFLECTION BOARD FOR DLR MONITOR (Ill. 13)

2.1 HORIZONTAL FREQUENCY

HHOLD horizontal frequency for all modes.

2.2 VERTICAL FREQUENCY

VHOLD 50Hz vertical frequency for 50Hz mode. This adjustment interferes with vertical amplitude.

VHOLD 60Hz vertical frequency for 60Hz mode. This adjustment interferes with vertical amplitude.

2.3 VERTICAL AMPLITUDE

VAMP 50Hz* vertical amplitude for 50Hz mode. This adjustment interferes also with the vertical amplitude of 60Hz mode.

VAMP4/3 50Hz* vertical amplitude for LLR4/3 50Hz mode.

VAMP 60Hz* vertical amplitude for 60Hz mode.

2.4 VERTICAL LINEARITY

VLIN 50Hz vertical linearity for 50Hz mode. This adjustment interferes with vertical amplitude and linearity of 60Hz mode.

VLIN 60Hz vertical linearity for 60Hz mode. This adjustment interferes with vertical amplitude of 60Hz mode.

C 60Hz correction of vertical linearity "C" for 60Hz mode. This adjustment interferes with vertical amplitude.

C 50Hz correction of vertical linearity "C" for 50Hz mode. This adjustment interferes with vertical amplitude.

2.5 IMAGE SHIFT

VSHIFT* vertical shift for all modes.

HSHIFT 31kHz* horizontal shift for HLR mode.

HSHIFT 15kHz* horizontal shift for LLR mode.

2.6 BLANKING

HBLANK* horizontal blanking.

2.7 BRIGHTNESS

BRIGHT brightness.

2.8 FOCUS

MFOCUS static focus.

HFOCUS horizontal dynamic focus.

VFOCUS ertical dynamic focus.

2.9 HORIZONTAL LINEARITY

HLIN15kHz horizontal linearity for LLR mode. This adjustment interferes with horizontal amplitude.

HLIN31kHz horizontal linearity for HLR mode. This adjustment interferes with horizontal amplitude.

All these trimmers can be adjusted on the right side of the monitor after removing the plastic cover.

Adjustments with an asterisk (*) are performed with multiturn trimmers.

ILLUSTRATION 10
FRONT VIEW

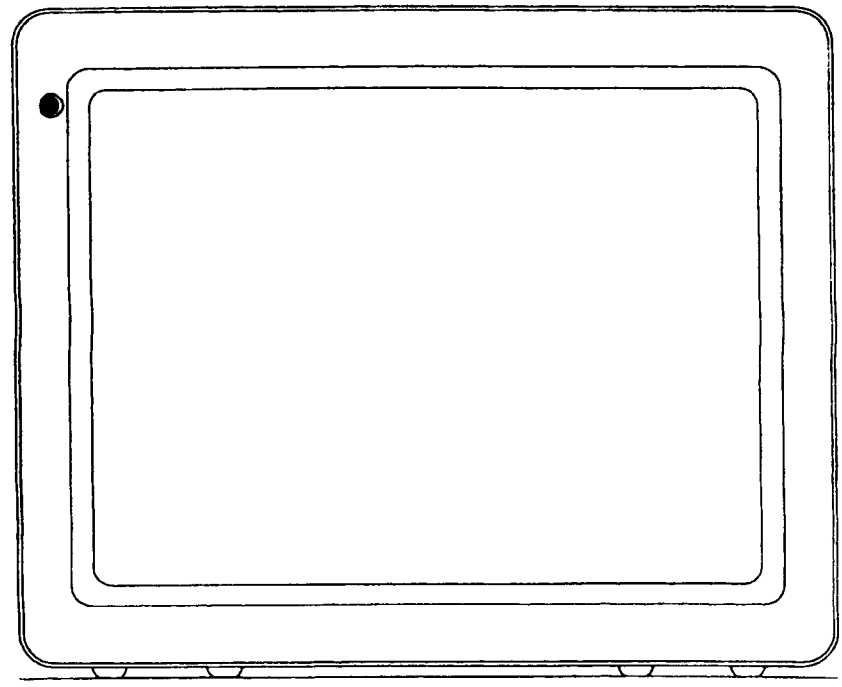


ILLUSTRATION 11
REAR VIEW

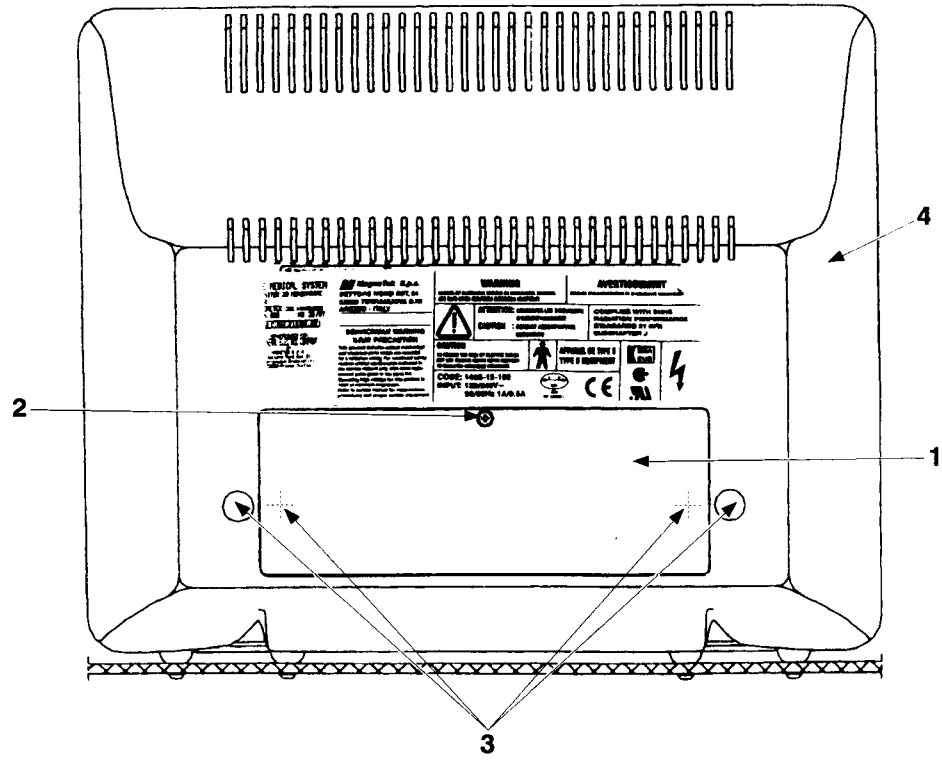


ILLUSTRATION 12
LEFT SIDE DLR MONITOR 20"
(L.V. POWER SUPPLY)

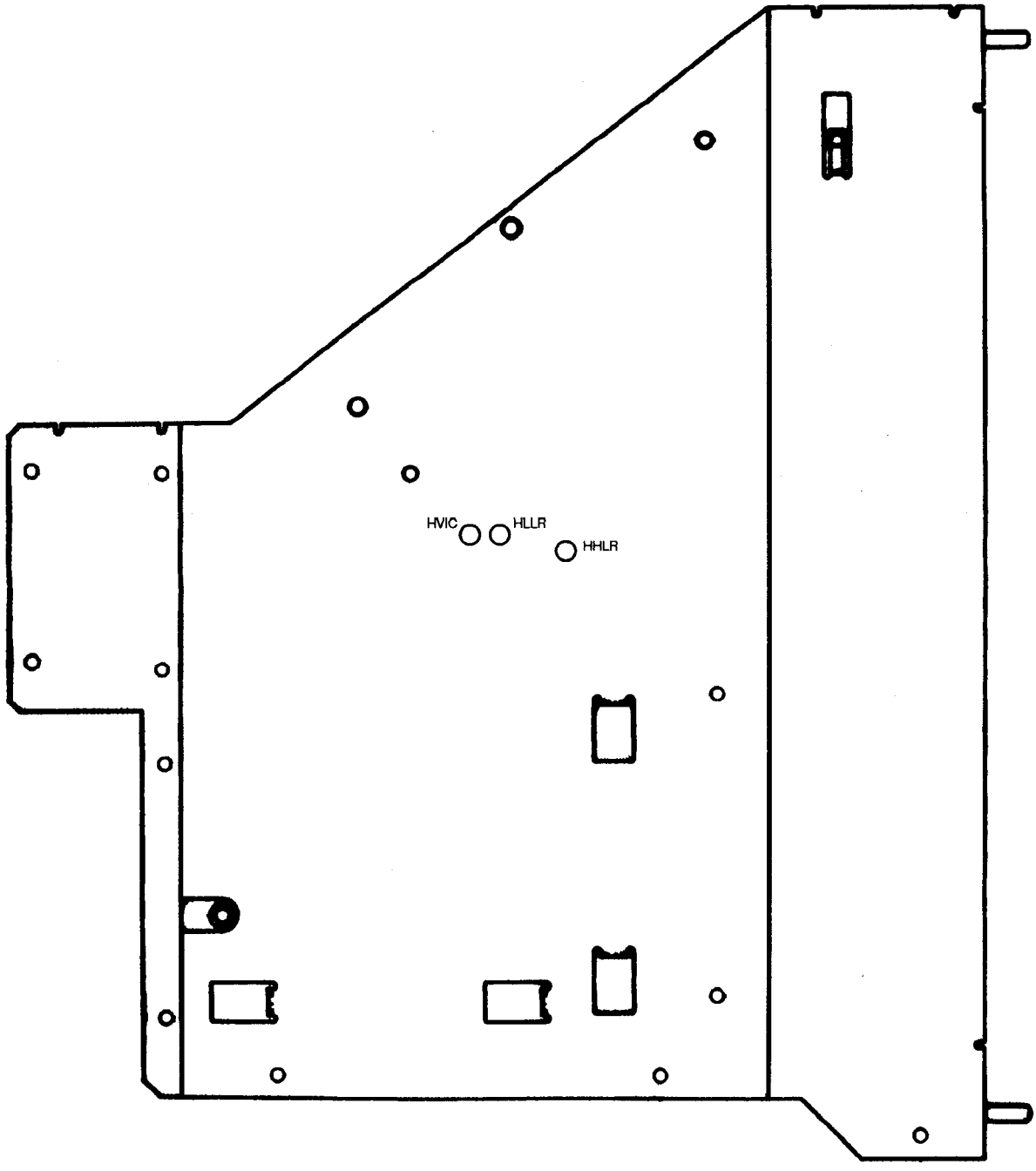


ILLUSTRATION 13
LEFT SIDE DLR MONITOR 15"
(L.V. POWER SUPPLY)

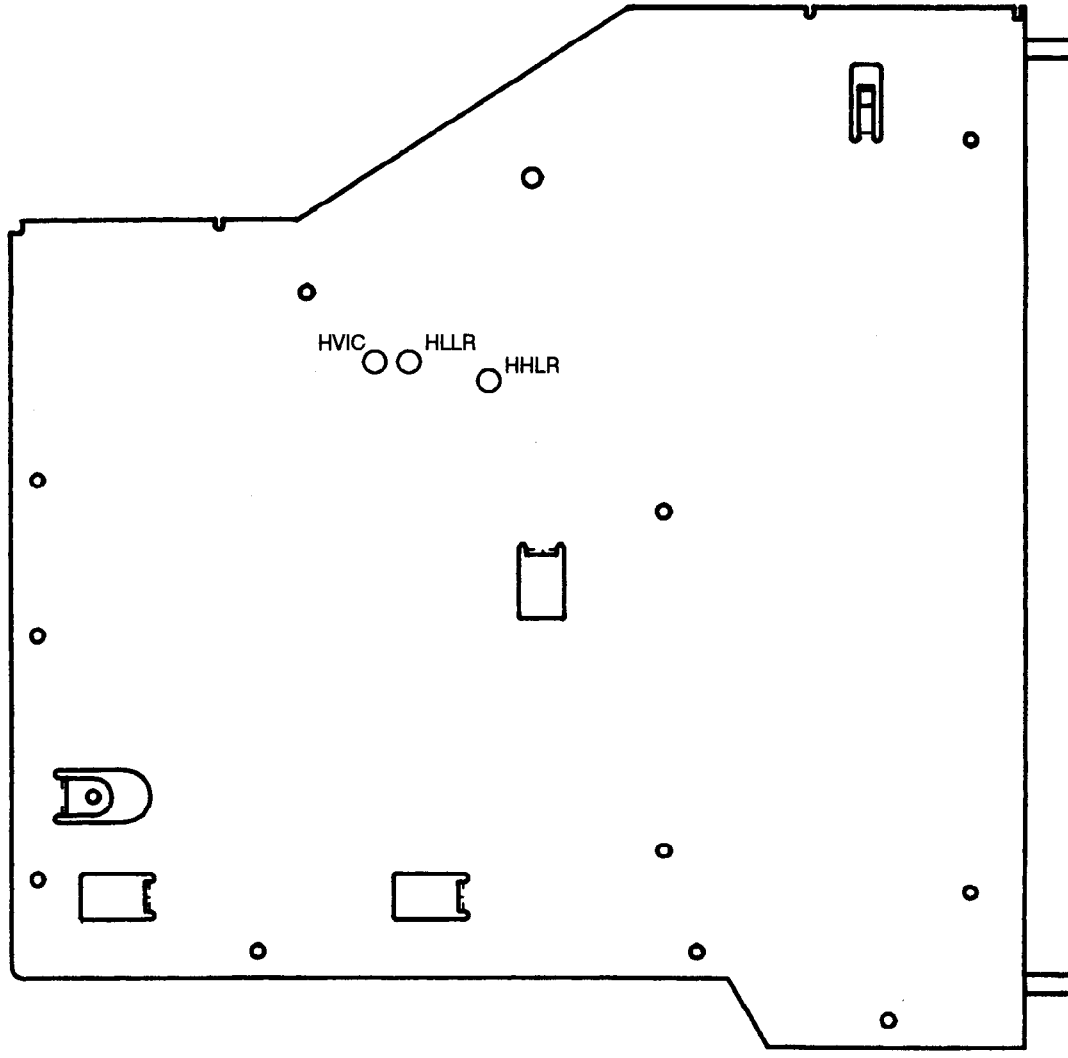
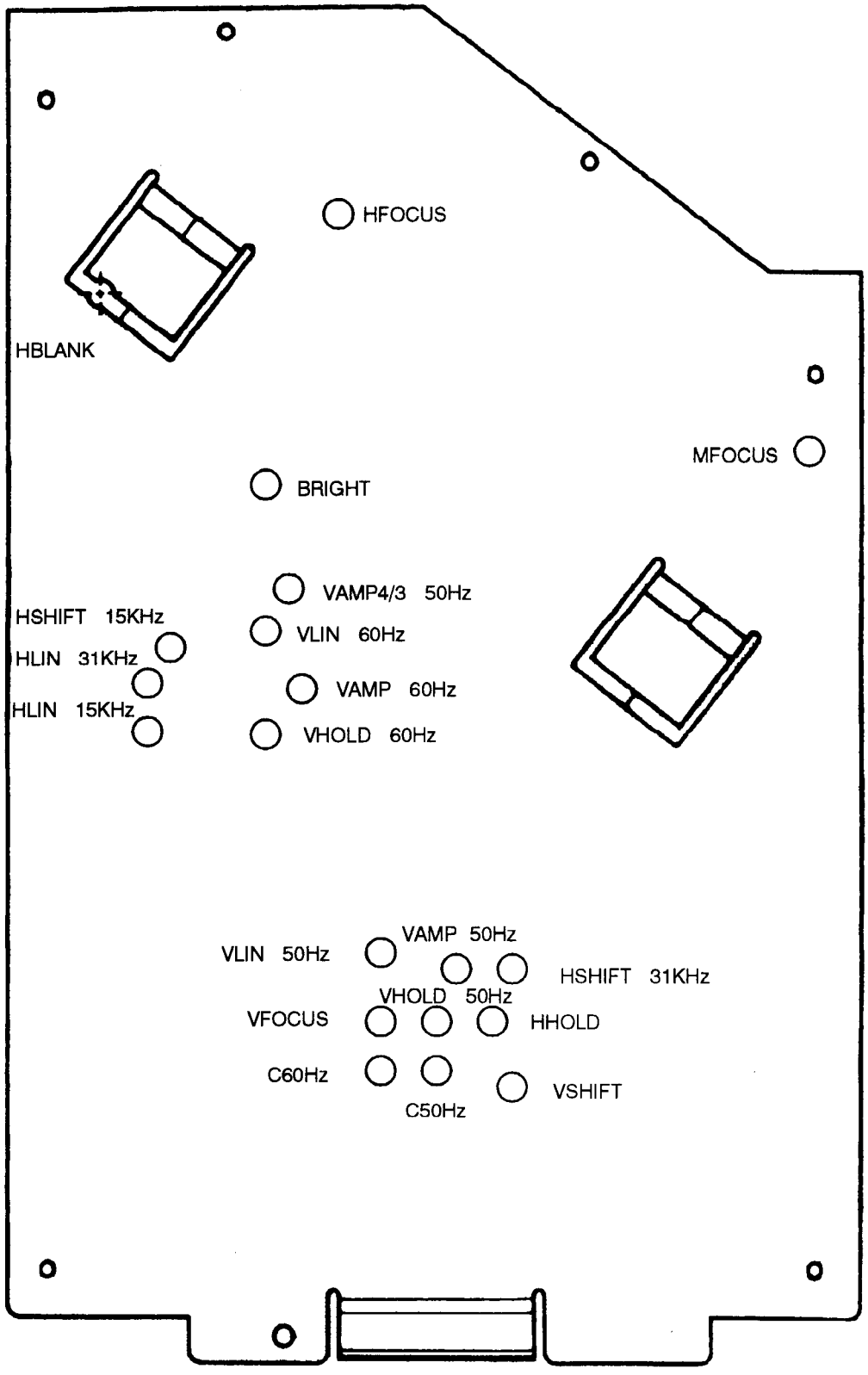


ILLUSTRATION 14
RIGHT SIDE DLR MONITOR 20"
(DEFLECTION BOARD)



CHAPTER 6 - BRIGHTNESS AND CONTRAST ADJUSTMENT

SECTION 1
LIGHT SENSOR SET FOR DISTAR-M MONITOR

1.1 LIGHT SENSOR SET FOR DLR AND LLR ROT MONITOR

The light sensor (Ill. 20, Item 1) is set in order to keep the contrast ratio constant when environment light ranges from 20 Lux to 50 Lux. The light sensor is active up to about 200 Lux.

The standard setting for DLR is the following:

HLR 1/1 50Hz MODE

Environment light 0 Lux

Green Led off

Raster brightness (50 mV) 0,4 ± 0,1 Cd/m^2
(Adj. with ITEM 5 ILL. 9)

Video brightness (700 mV) 150 ± 7 Cd/m^2
(Adj. with ITEM 6 ILL. 9)

Environment light 20 Lux

Green Led on

Raster brightness (50 mV) 1 ± 0,1 Cd/m^2
(Adj. with ITEM 5 ILL. 9)

Video brightness (700 mV) 150 ± 7 Cd/m^2
(Adj. with ITEM 6 ILL. 9)

Environment light 50 Lux

Green Led on

Raster brightness (50 mV) 2 ± 0,2 Cd/m^2
(Adj. with ITEM 5 ILL. 9)

Video brightness (700 mV) 300 ± 15 Cd/m^2
(Adj. with ITEM 6 ILL. 9)

The standard setting for LLR ROT is the following:

LLR 4/3 50Hz MODE

Environment light 0 Lux

Green Led off

Raster brightness (50 mV) 0,4 ± 0,1 Cd/m^2
(Adj. with ITEM 5 ILL. 9)

Video brightness (700 mV) 150 ± 7 Cd/m^2
(Adj. with ITEM 6 ILL. 9)

Environment light 20 Lux

Green Led on

Raster brightness (50 mV) 1 ± 0,1 Cd/m^2
(Adj. with ITEM 5 ILL. 9)

Video brightness (700 mV) 150 ± 7 Cd/m^2
(Adj. with ITEM 6 ILL. 9)

Environment light 50 Lux

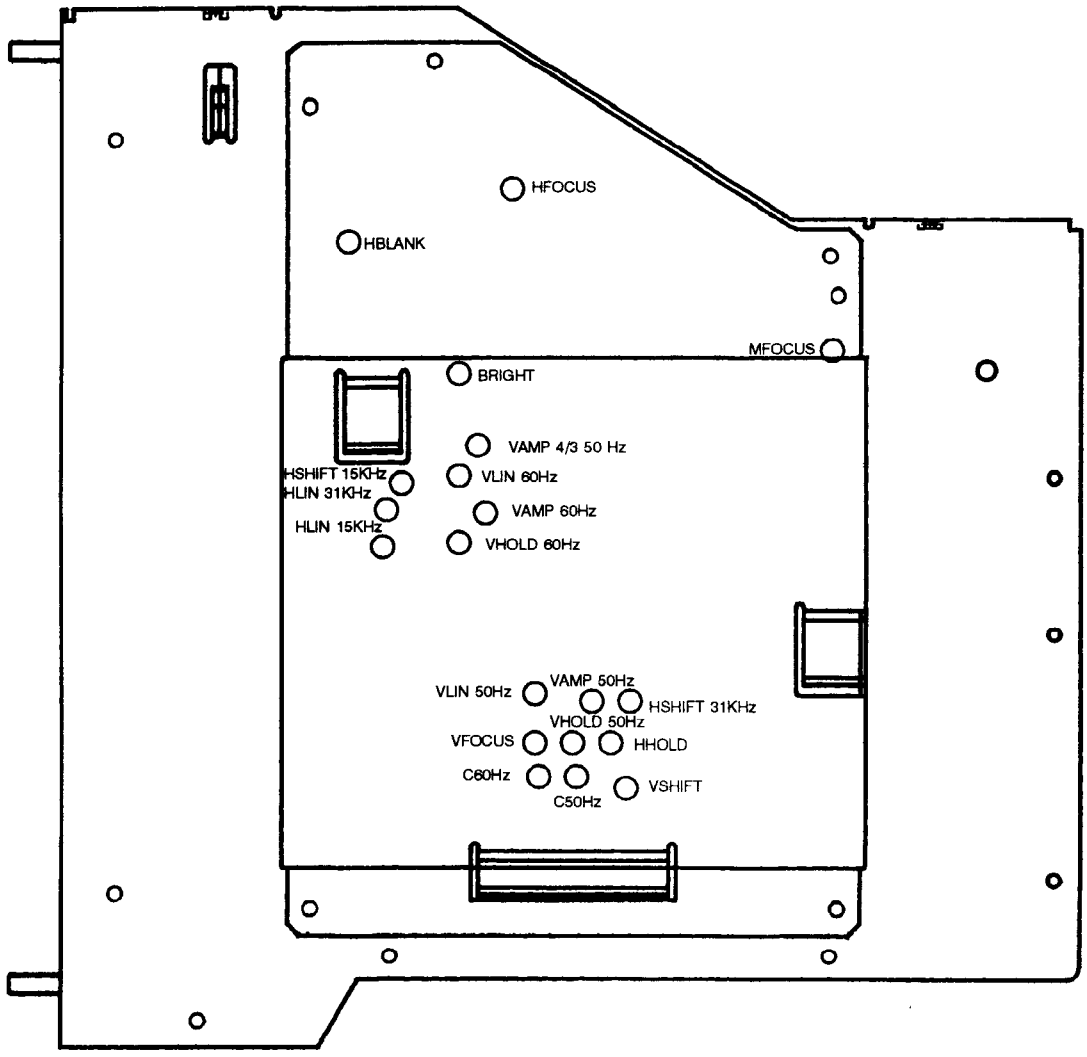
Green Led on

Raster brightness (50 mV) 2 ± 0,2 Cd/m^2
(Adj. with ITEM 5 ILL. 9)

Video brightness (700 mV) 300 ± 15 Cd/m^2
(Adj. with ITEM 6 ILL. 9)

In order to modify this setting it is necessary to adjust the three trimmers placed on the back of the monitor.

ILLUSTRATION 15
RIGHT SIDE DLR MONITOR 15"
(DEFLECTION BOARD)



FFD MONITOR ADJUSTMENTS

SECTION 3
ADJUSTMENTS ON L.V. POWER SUPPLY BOARD FOR FFD MONITOR (Ill. 16)

3.1 HORIZONTAL AMPLITUDE

H. 100Hz horizontal amplitude adjustment for mode at 100Hz.

H. 120Hz horizontal amplitude adjustment for mode at 100Hz.

These trimmers can be adjusted on the left side of the monitor after removing the plastic cover.

SECTION 4
ADJUSTMENTS ON DEFLECTION BOARD FOR FFD MONITOR (Ill. 17)

4.1 HORIZONTAL FREQUENCY

H. HOLD horizontal frequency for all modes.

4.2 VERTICAL FREQUENCY

V. HOLD 100Hz vertical frequency for 100Hz mode. This adjustment interferes with vertical amplitude.

V. HOLD 120Hz vertical frequency for 120Hz mode. This adjustment interferes with vertical amplitude.

4.3 VERTICAL AMPLITUDE

VAMP 100Hz* vertical amplitude for 100Hz mode. This adjustment interferes also with the vertical amplitude of 120Hz mode.

V. AMP 120Hz* vertical amplitude for 120Hz mode.

4.4 VERTICAL LINEARITY

V. LIN 100Hz vertical linearity for 100Hz mode. This adjustment interferes with vertical amplitude and linearity of 120Hz mode.

V. LIN 120Hz vertical linearity for 120Hz mode. This adjustment interferes with vertical amplitude of 120Hz mode.

C. 120Hz correction of vertical linearity "C" for 120Hz mode. This adjustment interferes with vertical amplitude.

C. 100Hz correction of vertical linearity "C" for 100Hz mode. This adjustment interferes with vertical amplitude.

4.5 IMAGE SHIFT

V. SHIFT* MASTER vertical shift for all modes.

H. SHIFT 31kHz* horizontal shift for all mode.

H. SHIFT 100Hz* horizontal shift for 100Hz mode.

V. SHIFT 100Hz* horizontal shift for 100Hz mode.

4.6 BLANKING

H. BLANK* horizontal blanking.

4.7 BRIGHTNESS

BRIGHT brightness.

4.8 FOCUS

M. FOCUS static focus.

H. FOCUS horizontal dynamic focus.

V. FOCUS vertical dynamic focus.

4.9 HORIZONTAL LINEARITY

H. LIN horizontal linearity for all mode. This adjustment interferes with horizontal amplitude.

All these trimmers can be adjusted on the right side of the monitor after removing the plastic cover.

Adjustments with an asterisk (*) are performed with multiturn trimmers.

ILLUSTRATION 16
LEFT SIDE MONITOR 20" FFD
(L.V. POWER SUPPLY)

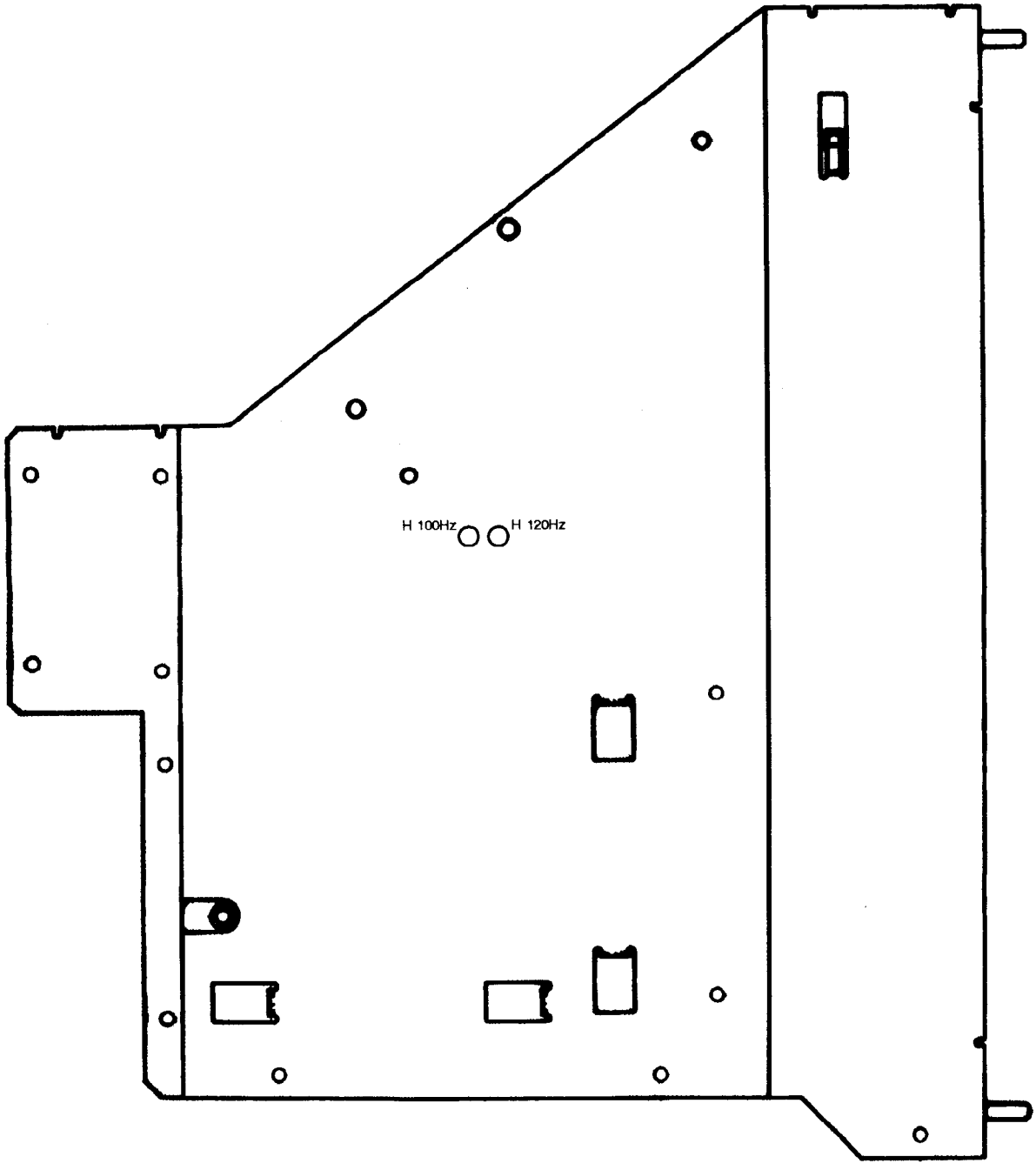
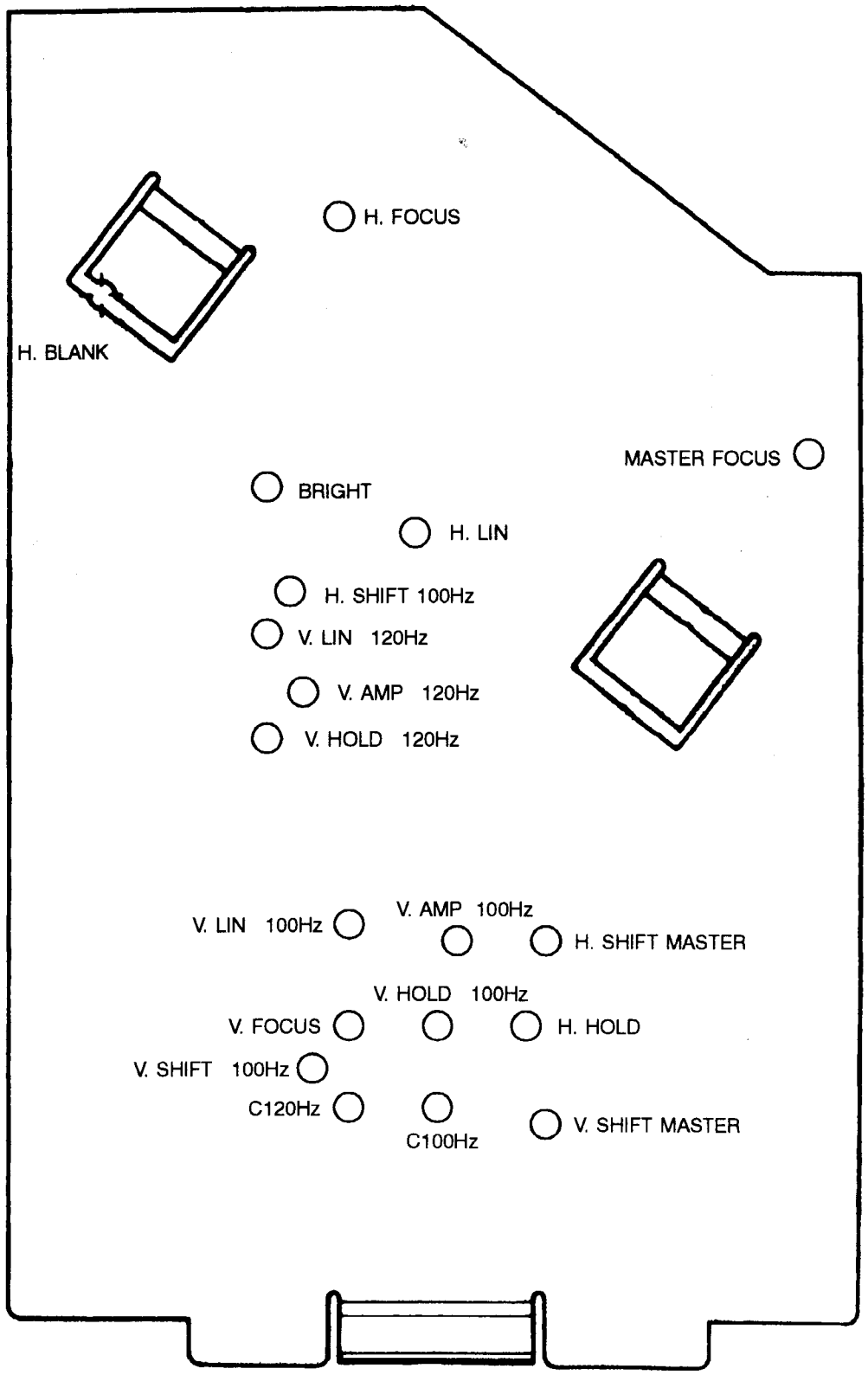


ILLUSTRATION 17
RIGHT SIDE MONITOR 20" FFD
(DEFLECTION BOARD)



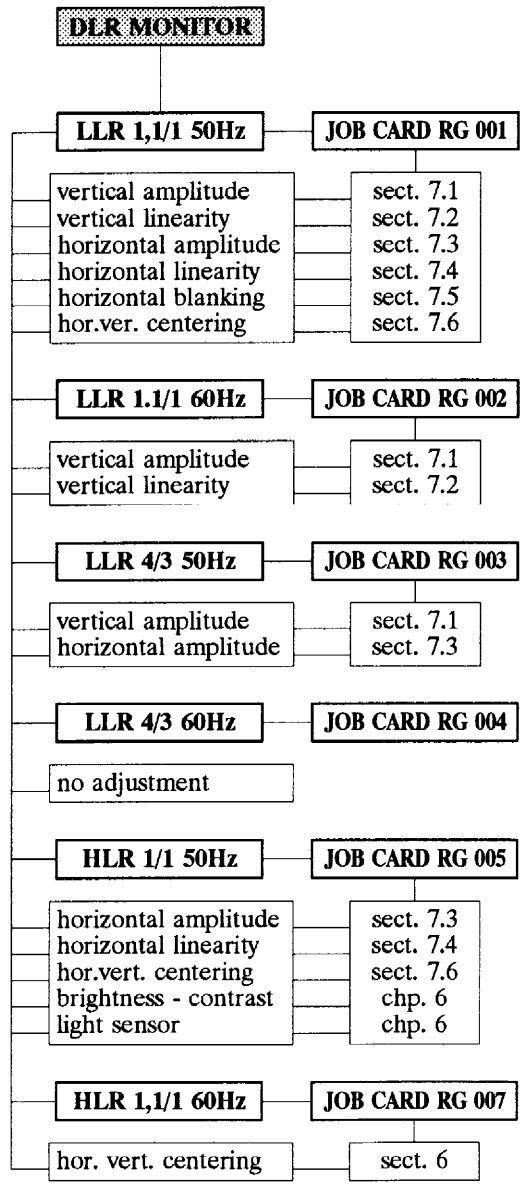
CHAPTER 5 - ADJUSTMENT PROCEDURE FOR DISTAR-M MONITOR

SECTION 1
GLOBAL ADJUSTMENT PROCEDURE FOR DISTAR-M MONITOR

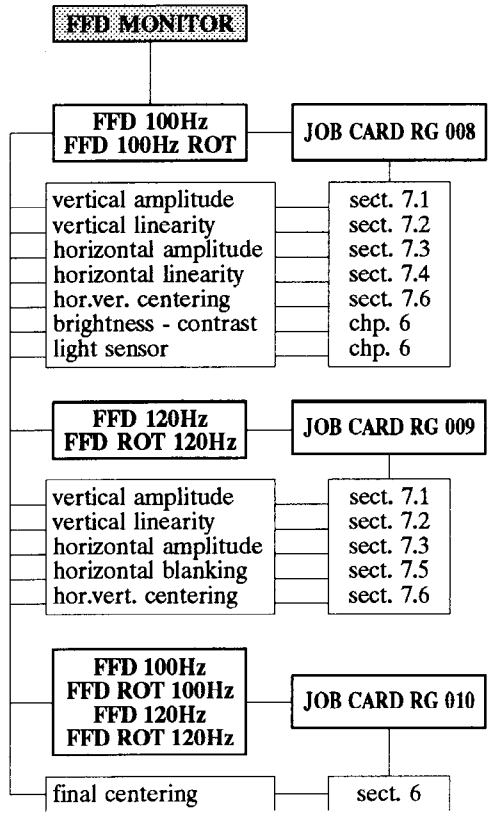
1.1 GLOBAL ADJUSTMENT PROCEDURE FOR DLR MONITOR

This is the theoretical logic order to adjust the complete format for the monitor. If you would lika adjust only some formats goes at the section 2 where is described only a partial procedure for every video formats.

For monitor LLR ROT use only a partial procedure LLR 4/3.



1.2 GLOBAL ADJUSTMENT PROCEDURE FOR FFD MONITOR



SECTION 2
PARTIAL ADJUSTMENT PROCEDURE FOR DISTAR-M MONITOR

2.1 PARTIAL ADJUSTAMENT PROCEDURE FOR DLR MONITOR

This procedure is for adjust the monitor for the format:

FORMAT

HLR 1/1	50Hz
LLR 1,1/1	50Hz
HLR 1,1/1	60Hz
LLR 1,1/1	60Hz

FORMAT

HLR 1,1/1	60Hz
HLR 1/1	50Hz

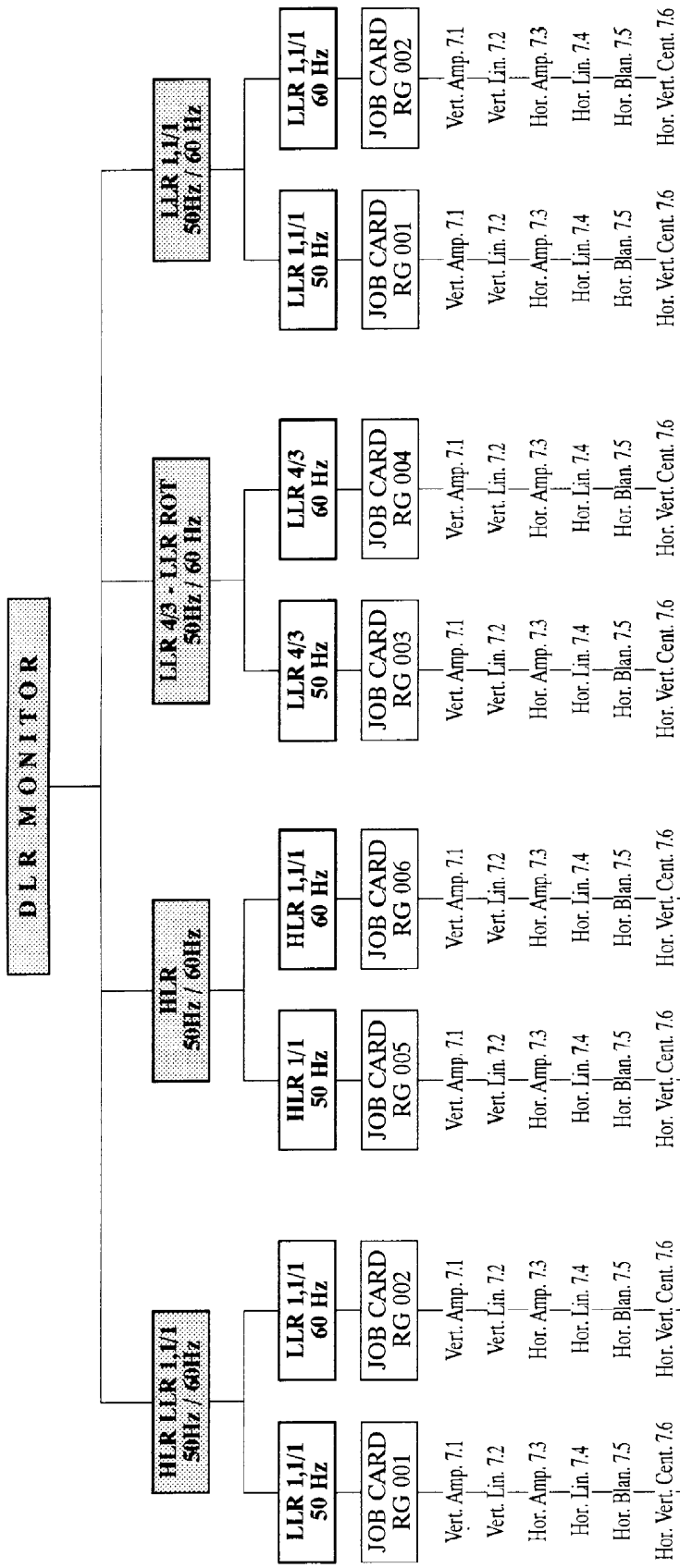
FORMAT

LLR 4/3	50Hz
LLR 4/3	60Hz
LLR ROT	50Hz
LLR ROT	60Hz

FORMAT

LLR 1,1/1	50Hz
LLR 1,1/1	60Hz

PARTIAL ADJUSTMENT PROCEDURE



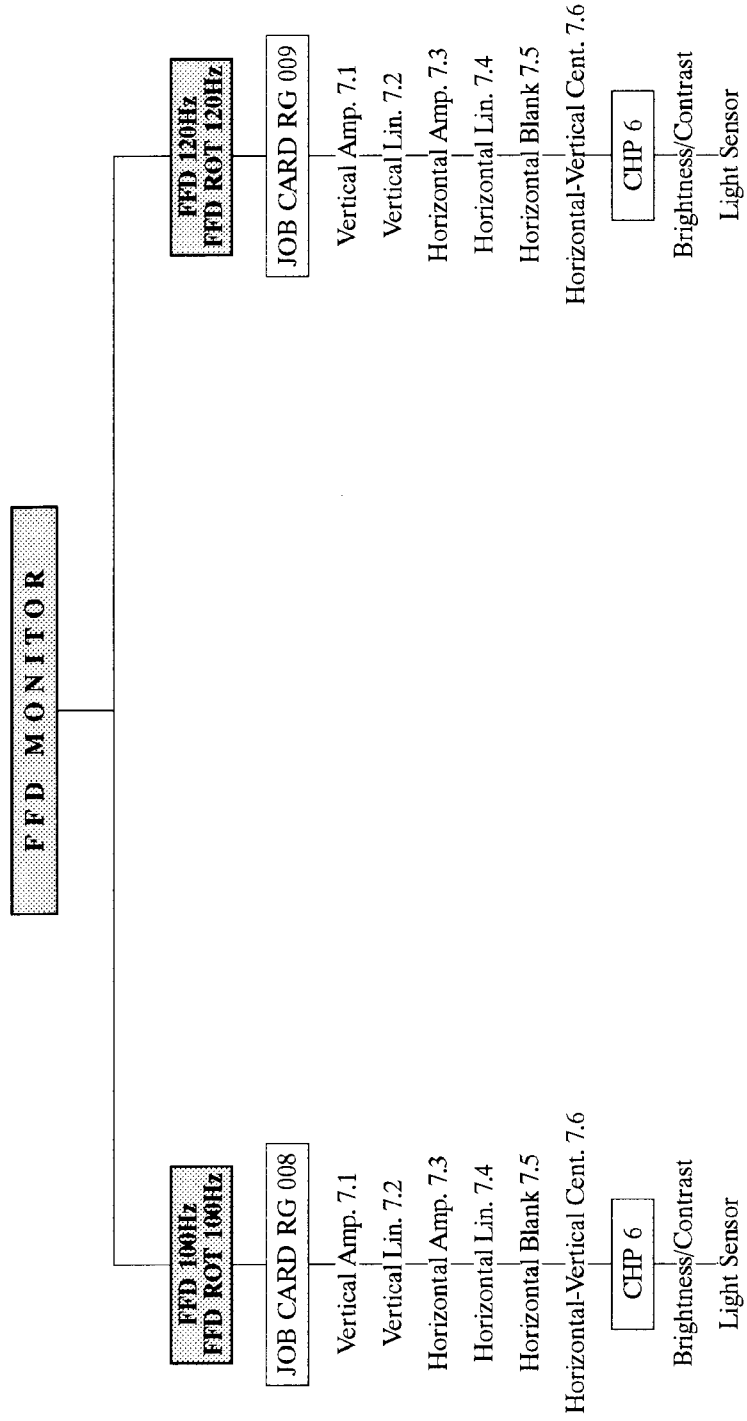
2.2 PARTIAL ADJUSTMENT PROCEDURE FOR FFD MONITOR

This procedure is for adjust the monitor for the format:

FORMAT	**FFD**	**100Hz**
	FFD ROT	**100Hz**

FORMAT	**FFD**	**120Hz**
	FFD ROT	**120Hz**

PARTIAL ADJUSTMENT PROCEDURE



SECTION 3
IMAGE DIMENSION FOR MONITOR DLR 20"/15" AND FFD 20"

For measurement use a metric ruler flexible and trasparent with 1mm scale.

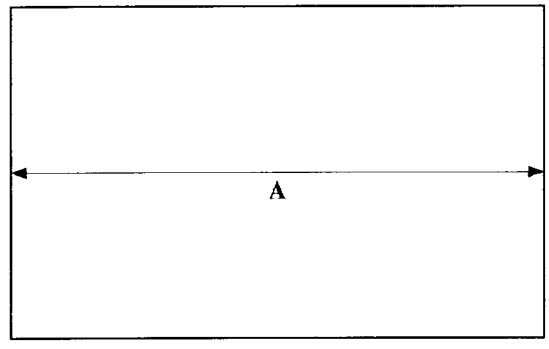
3.1 HORIZONTAL SIZE (A)

VIDEO DLR FORMAT	LLR 4/3 LLR ROT	LLR 1,1/1	HLR
20" 50Hz	360-+3mm	297-+3mm	270-+3mm
20" 60Hz	360-+3mm	297-+3mm	297-+3mm
15" 50Hz	273-+2mm	225-+2mm	205-+2mm
15" 60Hz	273±2mm	225±2mm	225±2mm

TAB. I

VIDEO FFD FORMAT	FFD - FFD ROT
20" 100Hz	359±3mm
20" 120Hz	359±3mm

TAB. V



Ill. 16

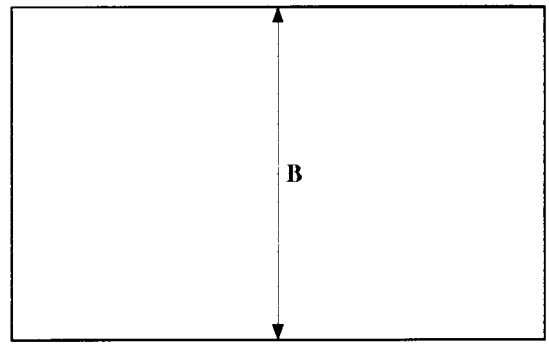
3.2 VERTICAL SIZE (B)

VIDEO DLR FORMAT	LLR 4/3 LLR ROT	LLR 1,1/1	HLR
20" - 50Hz/60Hz	270-+3mm	270-+3mm	270-+3mm
15" - 50Hz/60Hz	205-+2mm	205-+2mm	205-+2mm

TAB. II

VIDEO FFD FORMAT	FFD - FFD ROT
20" - 100Hz	270±3mm
20" - 120Hz	270±3mm

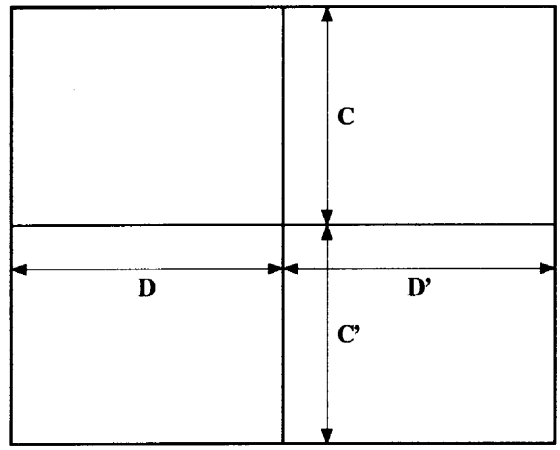
TAB. VI



Ill. 17

3.3 HORIZONTAL AND VERTICAL LINEARITY

Considering a image with a cross in the center four outlines how Ill. 18 or equivalent patter.



Ill. 18

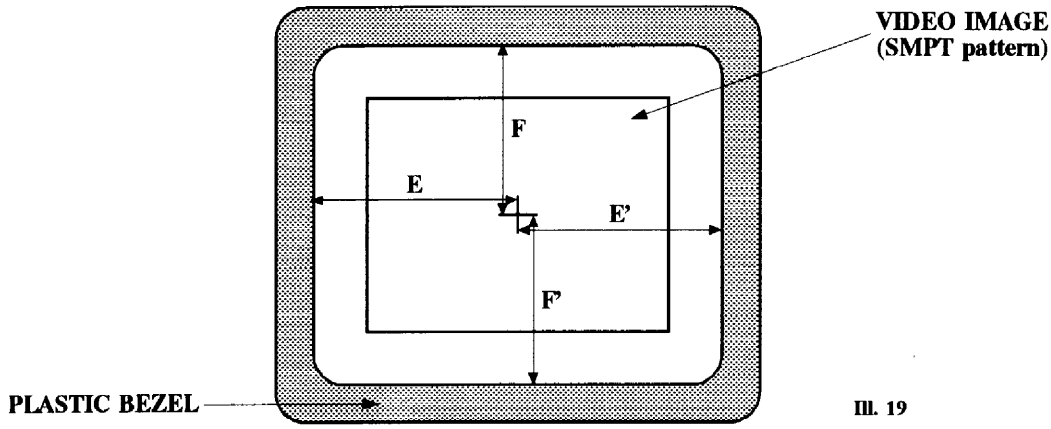
LINEARITY TOLLERANCE

20" FFD ROT - 20" FFD - 20" LLR ROT - 20" DLR	15" DLR
D=D'±1,5 mm	D=D'±1 mm
C=C'±1,5 mm	C=C'±1 mm

TAB. III

3.4 CENTERING IMAGE

Considering a SMPT image.



Ill. 19

CENTERING TOLLERANCE

20" FFD ROT - 20" FFD - 20" LLR ROT - 20" DLR	15" DLR
E=E'±6 mm	E=E'±4 mm
F=F'±6 mm	F=F'±4 mm

TAB. IV

15" and 20" DISTAR-M MONITORS Job Card RG 001

Purpose: **ADJUSTMENT OF LLR 1,1/1 50 Hz MODE**	Version No.: 0 Date: Mar/03/98
Time:	Personel: 1

SECTION 1
SUPPLIES REQUIRED

- None.

SECTION 2
TOOLS REQUIRED

- Standard tool case.
- Metric ruler flexible and trasparent with scale equal or less 1 mm.

SECTION 3
SAFETY PRECAUTIONS

- None.

SECTION 4
PREREQUISITES

- None.

SECTION 5
TASK DESCRIPTION

- Remove the rear cover (Ill. 11, Item 4) by removing the mounting screw (Ill. 11, Item 3) for 20" monitor. For monitor 15" before by removing the door screew (Ill. 11, Item 2).

SECTION 6
MODE SELECTION

- Set the rear switches to postition 50Hz and 1/1.
- Switch on the monitor and drive it with LLR 1,1/1 50Hz mode with 625-line vertical resolution.
- Use a cross-hatch image or a similar one, in order to be able to evaluate size and linearity.

ADJUSTMENT OF LLR 1,1/1
50 Hz MODE

Job Card RG 001

SECTION 7
ADJUSTMENT

7.1 Adjustments of vertical amplitude

Adjust VAMP50Hz so that the height of the image is conforming TAB II.

7.2 Adjustment of vertical linearity

Check the linearity of the two vertical half-frame is conforming TB III and if necessary adjust them by using C50Hz and VLIN50Hz.

Check vertical size again and if necessary adjust it with VAMP50Hz.

7.3 Adjustment of horizontal amplitude

Check that the horizontal size of the image is conforming TAB I otherwise adjust trimmer HVIC placed on the left side of the monitor.

7.4 Adjustment of horizontal linearity

Check the linearity of two horizontal half frame is conforming TAB III and if necessary adjust HLIN15kHz to obtain the best horizontal linearity.

Check horizontal size again and if necessary adjust it with HVIC.

7.5 Horizontal blanking

Adjust trimmer HBLANK to obtain a correct horizontal blanking (make sure that on the left side of the screen the video image is not cut).

7.6 Horizontal and vertical centering

Adjust VSHIFT so that the image is centered vertically and HSHIFT15kHz for a first approximate centering (TAB IV).

15" and 20" DISTAR-M MONITORS Job Card RG 002

Purpose: **ADJUSTMENT OF LLR 1,1/1 60 Hz MODE**	Version No.: 0 Date: Mar/03/98
Time:	Personel: 1

SECTION 1
SUPPLIES REQUIRED

- None.

SECTION 2
TOOLS REQUIRED

- Standard tool case.
- Metric ruler flexible and trasparent with scale equal or less 1 mm.

SECTION 3
SAFETY PRECAUTIONS

- None.

SECTION 4
PREREQUISITES

- None.

SECTION 5
TASK DESCRIPTION

- Remove the rear cover (Ill. 11, Item 4) by removing the mounting screw (Ill. 11, Item 3) for 20" monitor. For monitor 15" before removing the door screew (Ill. 11, Item 2).

SECTION 6
MODE SELECTION

- Set the rear switches to postition 60Hz and 1/1.
- Drive the monitor with LLR 1,1/1 60Hz mode with 525-line vertical resolution.
- Use a cross-hatch image or a similar one, in order to be able to evaluate size and linearity.

ADJUSTMENT OF LLR 1,1/1
60 Hz MODE

Job Card RG 002

SECTION 7
ADJUSTMENT

7.1 Adjustments of vertical amplitude

Adjust VAMP60Hz so that the height of the image is conforming TAB II.

7.2 Adjustment of vertical linearity

Check the linearity of the two vertical half-frame is conforming TAB III and if necessary adjust them by using VLIN60Hz and C60Hz.

Check vertical size again and if necessary adjust it with VAMP60Hz.

7.3 Adjustment of horizontal amplitude

Check that the horizontal size of the image is conforming TABI . In case of need see Job Card RG 001 sect. 7.3.

7.4 Adjustment of horizontal linearity

Check the linearity of two horizontal half frame is conforming TAB III and is necessary adjust HLIN15kHz to obtain the best horizontal linearity.

Check horizontal size again and if necessary adjust it with HVIC.

7.5 Horizontal blanking

Check that the active video on the left side of the monitor is wholly visible. If a correction should be necessary, adjust HBLANK.

7.6 Horizontal and vertical centering

In case of need see Job Card RG 001 sect. 7.6.

15" and 20" DISTAR-M MONITORS Job Card RG 003 1 of 2

Purpose: **ADJUSTMENT OF LLR 4/3 AND LLR ROT 50 Hz MODE**	Version No.: 1 Date: Mar/03/98
Time:	Personel: 1

SECTION 1
SUPPLIES REQUIRED

- None.

SECTION 2
TOOLS REQUIRED

- Standard tool case.
- Metric ruler flexible and trasparent with scale equal or less 1 mm.

SECTION 3
SAFETY PRECAUTIONS

- None.

SECTION 4
PREREQUISITES

- None.

SECTION 5
TASK DESCRIPTION

- Remove the rear cover (Ill. 11, Item 4) by removing the mounting screw (Ill. 11, Item 3) for 20" monitor. For monitor 15" before removing the door screew (Ill. 11, Item 2).

SECTION 6
MODE SELECTION

- Set the rear switches to postition 50Hz and 4/3.
- Drive the monitor with LLR 4/3 50Hz mode with 625-line vertical resolution.
- Use a cross-hatch image or a similar one.

ADJUSTMENT OF LLR 4/3 AND LLR ROT 50 Hz MODE

Job Card RG 003

SECTION 7
ADJUSTMENT

7.1 Adjustments of vertical amplitude

Adjust VAMP4/3 so that the height of the image is conforming TAB II.

7.2 Adjustment of vertical linearity

Check the vertical linearity is conforming TAB III, in case of need to adjust it see Job Card RG 001 sect. 7.2. Act carefully, as the linearity of LLR 1.1/1 formats can be altered.

7.3 Adjustment of horizontal amplitude

Check that the horizontal size of the image is conforming TAB I otherwise adjust trimmer HLLR placed on the left side of the monitor in order to obtain the right size.

7.4 Adjustment of horizontal linearity

In order to adjust horizontal linearity use HLIN15kHz; however, this adjustment also interferes with LLR 1.1/1 format. It is, therefore, necessary to find a good balance among the different formats (TAB III).

In case of adjustment of linearity, check horizontal size again.

7.5 Horizontal blanking

Check that the active video on left side of monitor is wholly visible .

If a correction should be necessary adjust H BLANK.

7.6 Horizontal and vertical centering

In case of need see Job Card RG 001 sect 7.6.

15" and 20" DISTAR-M MONITORS Job Card RG 004

Purpose: **ADJUSTMENT OF LLR 4/3 AND LLR ROT 60 Hz MODE**	Version No.: 1 Date: Mar/03/98
Time:	Personel: 1

SECTION 1
SUPPLIES REQUIRED

- None.

SECTION 2
TOOLS REQUIRED

- Standard tool case.
- Metric ruler flexible and trasparent with scale equal or less 1 mm.

SECTION 3
SAFETY PRECAUTIONS

- None.

SECTION 4
PREREQUISITES

- None.

SECTION 5
TASK DESCRIPTION

- Remove the rear cover (Ill. 11, Item 4) by removing the mounting screw (Ill. 11, Item 3) for 20" monitor. For monitor 15" before removing the door screew (Ill. 11, Item 2).

SECTION 6
MODE SELECTION

- Set the rear switches to postition 60Hz and 4/3.
- Drive the monitor with LLR 4/3 60Hz mode with 525-line vertical resolution.
- Use a cross-hatch image or a similar one.

ADJUSTMENT OF LLR 4/3 AND LLR ROT 60 Hz MODE

Job Card RG 004

SECTION 7
ADJUSTMENT

7.1 Adjustments of vertical amplitude

Check that the vertical size of the image is conforming TAB II.

In case of need act as in Job Card RG 002 sect. 7.1, taking into account that these adjustments also interfere with the other LLR1,1/1 format.

7.2 Adjustment of vertical linearity

Check the linearity of tow vertical half frame is conforming TAB III and if necessary adjust

Them act as in Job Card RG 002 sect. 7.2.

7.3 Adjustment of horizontal amplitude

Check that the horizontal size of the image is conforming TAB I.

In case of need see Job Card RG 001 sect. 7.3. The adjustment of horizontal size also interferes with LLR 4/3 50Hz format.

7.4 Adjustment of horizontal linearity

In order to adjust horizontal linearity use HLIN15kHz; however, this adjustment also interferes with LLR 1.1/1 format. It is, therefore, necessary to find a good balance among the different formats (TAB III).

In case of adjustment of linearity, check horizontal size again.

7.5 Horizontal blanking

Check that the active video on left side of monitor is wholly visible if correction should be necessary adjust HBLANK.

7.6 Horizontal and vertical centering

In case of need see Job Card RG 001 sect. 7.6.

15" and 20" DISTAR-M MONITORS Job Card RG 005

Purpose: **ADJUSTMENT OF HLR 1/1 50 Hz MODE**	Version No.: 0 Date: Mar/03/98
Time:	Personel: 1

SECTION 1
SUPPLIES REQUIRED

- None.

SECTION 2
TOOLS REQUIRED

- Standard tool case.
- Metric ruler flexible and trasparent with scale equal or less 1 mm.

SECTION 3
SAFETY PRECAUTIONS

- None.

SECTION 4
PREREQUISITES

- None.

SECTION 5
TASK DESCRIPTION

- Remove the rear cover (Ill. 11, Item 4) by removing the mounting screw (Ill. 11, Item 3) for 20" monitor. For monitor 15" before removing the door screew (Ill. 11, Item 2).

SECTION 6
MODE SELECTION

- Set the rear switches to postition 1/1 and 50Hz.
- Drive the monitor with HLR 1/1 50Hz mode with 1249-line vertical resolution.
- Use a cross-hatch image or a similar one.

ADJUSTMENT OF HLR 1/1
50 Hz MODE

Job Card RG 005

SECTION 7
ADJUSTMENT

7.1 Adjustments of vertical amplitude

Check that the vertical size of the image is conforming TABII.

In case of need see Job Card RG 001 sect. 7.1. This adjustment also interferes with LLR 1.1/1 50Hz and LLR4/3 50Hz formats.

7.2 Adjustment of vertical linearity

Check the vertical linearity is conforming TAB III, in case of need see Job Card RG 001 sect. 7.2.

7.3 Adjustment of horizontal amplitude

Check that the horizontal size of the image is conforming TABI; in case of need adjust trimmer HHLR placed on the left side of the monitor.

7.4 Adjustment of horizontal linearity

Check the linearity of the two horizontal half-frame is conforming TAB III and adjust HLIN31kHz to improve linearity. Check the horizontal size again and use HHLR to adjust it.

7.5 Horizontal blanking

Check that the active video on left side of monitor is wholly visible , if correction should be necessary adjust HBLANK

7.6 Horizontal and vertical centering

Adjust VSHIFT to center the image vertically and HSHIFT31kHz to center the image horizontally (TAB IV).

15" and 20" DISTAR-M MONITORS Job Card RG 006

Purpose: **ADJUSTMENT OF HLR 1,1/1 60 Hz MODE**	Version No.: 0 Date: Mar/03/98
Time:	Personel: 1

SECTION 1
SUPPLIES REQUIRED

- None.

SECTION 2
TOOLS REQUIRED

- Standard tool case.
- Metric ruler flexible and trasparent with scale equal or less 1 mm.

SECTION 3
SAFETY PRECAUTIONS

- None.

SECTION 4
PREREQUISITES

- None.

SECTION 5
TASK DESCRIPTION

- Remove the rear cover (Ill. 11, Item 4) by removing the mounting screw (Ill. 11, Item 3) for 20" monitor. For monitor 15" before removing the door screew (Ill. 11, Item 2).

SECTION 6
MODE SELECTION

- Set the rear switches to postition 60Hz and 1/1.
- Drive the monitor with HLR 1,1/1 60Hz mode with 1023-line vertical resolution.

ADJUSTMENT OF HLR 1,1/1
60 Hz MODE

Job Card RG 006

SECTION 7
ADJUSTMENT

7.1 Adjustments of vertical amplitude

Check that the vertical size of the image is conforming TABII.

In case of need see Job Card RG 002 sect. 7.1. This adjustment also interferes with LLR 1.1/1 60Hz and LLR4/3 60Hz formats.

7.2 Adjustment of vertical linearity

Check the vertical linearity is conforming TAB III, if necessary adjust see Job Card RG 002 sect. 7.2.

7.3 Adjustment of horizontal amplitude

Check that the horizontal size of the image is conforming TABI.

In case need adjust see Job Card RG 005 sect. 7.3.

7.4 Adjustment of horizontal linearity

Check horizontal linearity is conforming TAB III, if need adjust see Job Card RG 005 sect. 7.4.

7.5 Horizontal blanking

Check active video on left side of the monitor is wholly visible In case of need use trimmer HBLANK.

7.6 Horizontal and vertical centering

No adjustments are necessary. In case of need see Job Card RG 005 sect. 7.6.

15" and 20" DISTAR-M MONITORS Job Card RG 007 1 of 1

Purpose: **FINAL CENTERING FOR DLR MONITOR FOR ALL MODES**	Version No.: 2 Date: May/20/98
Time:	Personel: 1

SECTION 1
SUPPLIES REQUIRED

- None.

SECTION 2
TOOLS REQUIRED

- Standard tool case.
- Metric ruler flexible and trasparent with scale equal or less 1 mm.

SECTION 3
SAFETY PRECAUTIONS

- None.

SECTION 4
PREREQUISITES

- None.

SECTION 5
TASK DESCRIPTION

- Remove the rear cover (Ill. 11, Item 4) by removing the mounting screw (Ill. 11, Item 3) for 20" monitor. For monitor 15" before removing the door screew (Ill. 11, Item 2).

SECTION 6
CENTERING

- Center the image horizontally in the two HLR modes by adjusting HSHIFT31kHz. Also check the centering of LLR modes and adjust trimmer HSHIFT15kHz so that the all images position are in accord with Tab IV.

15" and 20" DISTAR-M MONITORS Job Card RG 008

Purpose: **ADJUSTMENT OF FFD AND FFD ROT 100 Hz MODE**	Version No.: 2 Date: May/20/98
Time:	Personel: 1

SECTION 1
SUPPLIES REQUIRED

- None.

SECTION 2
TOOLS REQUIRED

- Standard tool case.
- Metric ruler flexible and trasparent with scale equal or less 1 mm.

SECTION 3
SAFETY PRECAUTIONS

- None.

SECTION 4
PREREQUISITES

- None.

SECTION 5
TASK DESCRIPTION

- Remove the rear cover (Ill. 11, Item 4) by removing the mounting screw (Ill. 11, Item 3) for 20" monitor.

SECTION 6
MODE SELECTION

- Set the rear switches to postition 50Hz.
- Switch on the monitor and drive it with FFD 100Hz mode with 625-line vertical resolution.
- Use a cross-hatch image or a similar one, in order to be able to evaluate size and linearity.

ADJUSTMENT OF FFD AND FFD ROT 100 Hz MODE Job Card RG 008 2 of 2

SECTION 7
ADJUSTMENT

7.1 Adjustments of vertical amplitude

Adjust V. AMP100Hz so that the height of the image is conforming TAB VI.

7.2 Adjustment of vertical linearity

Check the linearity of the two vertical half-frame is conforming TB III and if necessary adjust them by using C100Hz and V. LIN100Hz.

Check vertical size again and if necessary adjust it with VAMP100Hz.

7.3 Adjustment of horizontal amplitude

Check that the horizontal size of the image is conforming TAB V otherwise adjust trimmer H. 100Hz placed on the left side of the monitor.

7.4 Adjustment of horizontal linearity

Check the linearity of two horizontal half frame is conforming TAB III and if necessary adjust H. LIN to obtain the best horizontal linearity.

Check horizontal size again and if necessary adjust it with H. 100Hz.

7.5 Horizontal blanking

Adjust trimmer H. BLANK to obtain a correct horizontal blanking (make sure that on the left side of the screen the video image is not cut).

7.6 Horizontal and vertical centering

Adjust V. SHIFT 100Hz (if necessary V. SHIFT MASTER) so that image is centerde vertcally, and H. SHIFT 100Hz (if necessary H. SHIFT MASTER) for a first approssimate centering (TAB IV).

15" and 20" DISTAR-M MONITORS Job Card RG 009

Purpose: **ADJUSTMENT OF FFD AND FFD ROT 120 Hz MODE**	Version No.: 2 Date: May/20/98
Time:	Personel: 1

SECTION 1
SUPPLIES REQUIRED

- None.

SECTION 2
TOOLS REQUIRED

- Standard tool case.
- Metric ruler flexible and trasparent with scale equal or less 1 mm.

SECTION 3
SAFETY PRECAUTIONS

- None.

SECTION 4
PREREQUISITES

- None.

SECTION 5
TASK DESCRIPTION

- Remove the rear cover (Ill. 11, Item 4) by removing the mounting screw (Ill. 11, Item 3) for 20" monitor.

SECTION 6
MODE SELECTION

- Set the rear switches to postition 120Hz.
- Drive the monitor with FFD 120Hz mode with 525-line vertical resolution.
- Use a cross-hatch image or a similar one, in order to be able to evaluate size and linearity.

ADJUSTMENT OF FFD AND FFD ROT 120 Hz MODE

Job Card RG 009

SECTION 7
ADJUSTMENT

7.1 Adjustments of vertical amplitude

Adjust V. AMP120Hz so that the height of the image is conforming TAB VI.

7.2 Adjustment of vertical linearity

Check the linearity of the two vertical half-frame is conforming TAB III and if necessary adjust them by using V. LIN120Hz and C120Hz.

Check vertical size again and if necessary adjust it with V. AMP120Hz.

7.3 Adjustment of horizontal amplitude

Check that the horizontal size of the image is conforming TAB V. Otherwise adjust trimmer H. 120Hz placed on the left side of the monitor.

7.4 Adjustment of horizontal linearity

Check the linearity of two horizontal half frame is conforming TAB III and is necessary adjust H. LIN to obtain the best horizontal linearity.

Check horizontal size again and if necessary adjust it with H. 120Hz.

7.5 Horizontal blanking

Check that the active video on the left side of the monitor is wholly visible. If a correction should be necessary, adjust H. BLANK.

7.6 Horizontal and vertical centering

Adjust V. SHIFT MASTER so that image is centered vertically and H. SHIFT MASTER so that image is centered horizzontally (TAB IV).

1.2 LIGHT SENSOR SET FOR FFD AND FFD ROT MONITOR

The light sensor (Ill. 20, Item 1) is set in order to keep the contrast ratio costant when enviroment light range from 70 Lux to 200 Lux.

The standard setting for FFD and FFD ROT is the following:

FFD 100Hz MODE

Environment light 0 Lux

Green Led off

Raster brightness (50 mV) 0,4 ± 1 Cd/m^2 (Adj. with ITEM 5 ILL. 9)

Video brightness (700 mV) 120 ± 6 Cd/m^2 (Adj. with ITEM 6 ILL. 9)

Environment light 70 Lux

Green Led on

Raster brightness (50 mV) 2,7 ± 0,3 Cd/m^2 (Adj. with ITEM 5 ILL. 9)

Video brightness (700 mV) 120 ± 6 Cd/m^2 (Adj. with ITEM 6 ILL. 9)

Environment light 200 Lux

Green Led on

Raster brightness (50 mV) 9 ± 1 Cd/m^2 (Adj. with ITEM 5 ILL. 9)

Video brightness (700 mV) 200 ± 10 Cd/m^2 (Adj. with ITEM 6 ILL. 9)

In order to modify this setting it is necessary to adjust the three trimmers placed on the back of the monitor.

15" and 20" DISTAR-M MONITORS Job Card RG 010

Purpose: **FINAL CENTERING FOR FFD AND FFD ROT MONITOR FOR ALL MODES**	Version No.: 2 Date: May/20/98
Time:	Personel: 1

SECTION 1
SUPPLIES REQUIRED

- None.

SECTION 2
TOOLS REQUIRED

- Standard tool case.
- Metric ruler flexible and trasparent with scale equal or less 1 mm.

SECTION 3
SAFETY PRECAUTIONS

- None.

SECTION 4
PREREQUISITES

- None.

SECTION 5
TASK DESCRIPTION

- Remove the rear cover (Ill. 11, Item 4) by removing the mounting screw (Ill. 11, Item 3) for 20" monitor.

SECTION 6
CENTERING

- Center the image horizontally in the FFD 120Hz modes by adjusting H. SHIFT MASTER. Also check the centering of FFD 100Hz modes and adjust trimmer H. SHIFT 100Hz so that the all images position are in accord with TAB IV.
- Center the image vertically in the FFD 120Hz mode bay adjusting V. SHIFT MASTER. Also check the centering of FFD 100Hz mode and adjust trimmer V. SHIFT 100Hz so that all images position are in accord with TAB IV.

SECTION 2
OPERATOR CONTROLS

ILLUSTRATION 20
FRONT VIEW

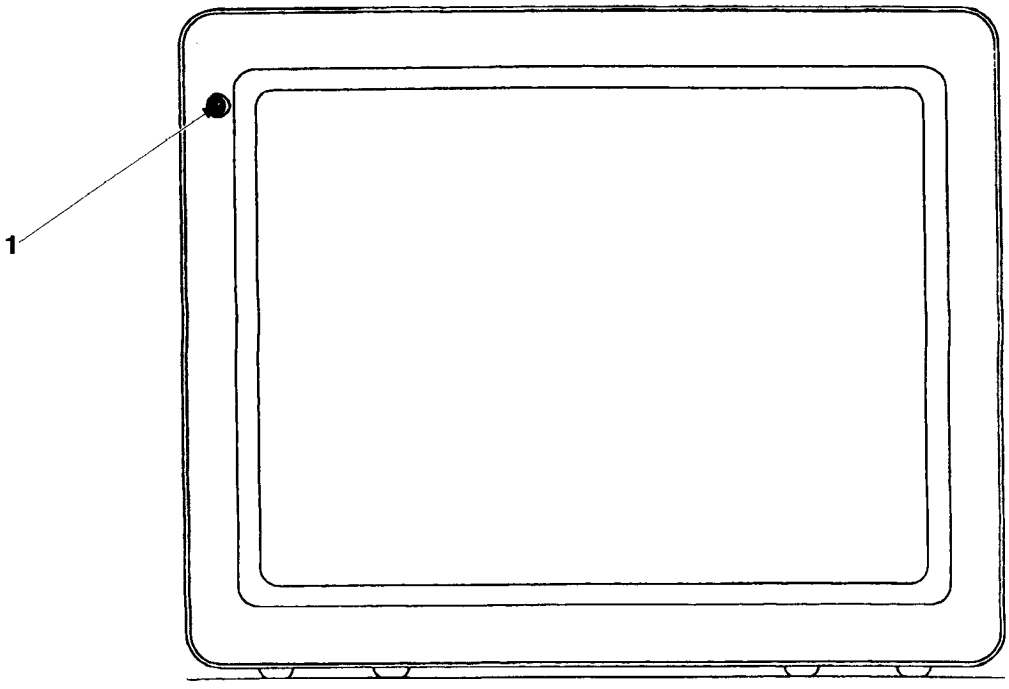
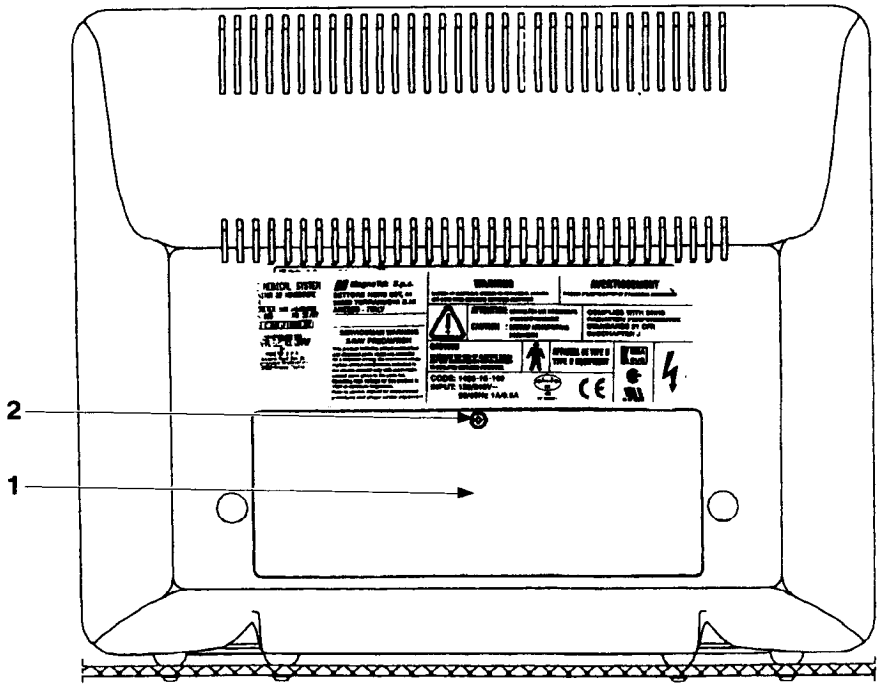


ILLUSTRATION 21
REAR VIEW



15" and 20" DISTAR-M MONITORS Job Card RG 011

Purpose: **BRIGHTNESS/CONTRAST ADJUSTMENTS GENERAL PROCEDURE**	Version No.: 2 Date: May/20/98
Time:	Personel: 1

SECTION 1
SUPPLIES REQUIRED

- None.

SECTION 2
TOOLS REQUIRED

- Standard tool kit.
- Luminancemeter type LS 100 MINOLTA or equivalent.
- Gray reference card 18% ± 1% (2110360).

SECTION 3
SAFETY PRECAUTIONS

- None.

SECTION 4
PREREQUISITES

- None.

SECTION 5
TASK DESCRIPTION

5.1 General Procedure with Luminance Meter

These controls are located on the back of the monitor and can be accessed by removing the rear door (Ill. 1).
For rear door removal, see Chapter 2, Job Card IST 001.

The purpose of these settings is to ensure that, for any room ambient light level, the dark grays are not below the monitor cut-off level and the image contrast ratio is satisfactory.

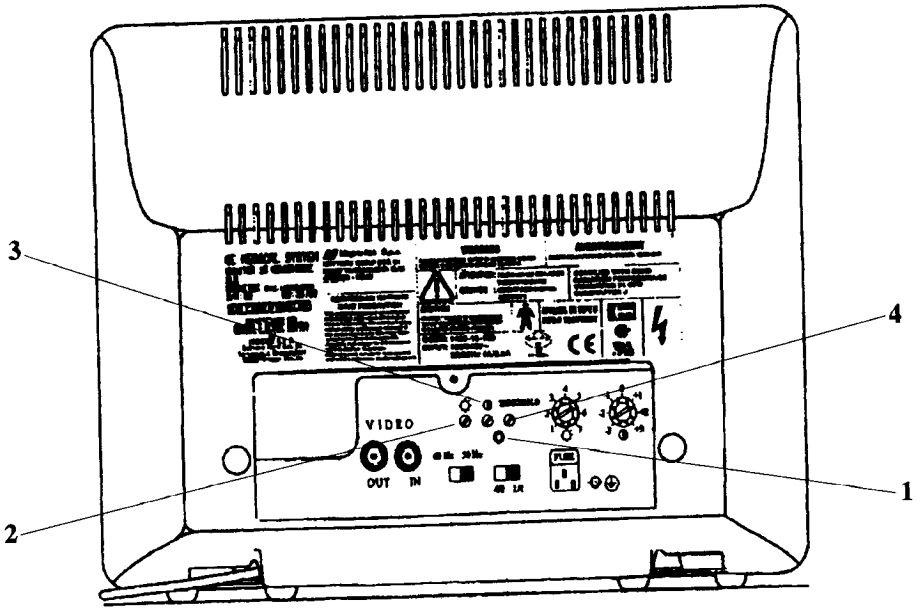
BRIGHTNESS/CONTRAST ADJUSTMENTS
GENERAL PROCEDURE

Job Card RG 011

5.1.1 Recommendations

- Power on the monitor and allow a 15- to 20-minute warm-up period before measuring any values.
- The light meter should be in the position normally occupied by the operator, and not less than one meter from the screen.
- The procedure and final values will vary slightly between systems (test patterns for digital systems, or image quality criteria for analog systems, can differ from one system to another). However, the general DISTAR adjustment procedure described in the following pages should be applied.

ILLUSTRATION 22
REAR VIEW OF MONITOR WITH REAR DOOR REMOVED



ITEM	FUNCTION
1	LED
2	CEL Brightness Control
3	CEL Contrast Control
4	CEL Threshold Control

5.1.2Definitions used in the Procedure

Luminance (L) expressed in candela per square meter (cd/m2).

- 1 cd/m2 = 0.29 fL
- 1 fL = 3.42 cd/m2.

LA = Reference luminance (white image).

LB = Luminance at white level (digital pattern).

LO = Zero dose luminance (black pattern).

LP = Phosphorus out luminance (monitor off).

LN = Luminance at point of operation (analog fluoroscopy).

CEL = Cell.

5.1.3Controls Presentation and Description

See Illustration 1 for a presentation of the controls:

- Monitor Brightness Control: modifies the tube bias of the monitor. Turn it clockwise to illuminate the raster or increase the black level.
- Monitor Contrast Control: modifies the video gain. Turn it clockwise to increase the white level.
- LED and CEL Threshold Control (Ill. 22, Items 1 and 4). The CEL Threshold Control sets the threshold level of ambient light at which CEL becomes active; LED indicates whether CEL is active:
  - When LED is ON, the CEL is active,
  - When LED is OFF, the CEL is not active,
  - Turn the CEL Threshold Control clockwise to increase the threshold level of ambient light, anti – clockwise to reduce it.
- CEL Brightness Control (Ill. 22, Item 2): operates as the Monitor Brightness Control when CEL is active.
- CEL Contrast Control (Ill. 22, Item 3): operates as the Monitor Contrast Control when CEL is active.

5.1.4General Procedure

- The same procedure is used to adjust Monitor Brightness and Contrast settings or the CEL Brightness and Contrast settings. Check that CEL is not active during Monitor setting up (LED is OFF).
- Generally, two levels of ambient light can be defined: for example, for Fluoroscopy and for Review, for two types of examination, for the presence or not of an external light, etc.

BRIGHTNESS/CONTRAST ADJUSTMENTS GENERAL PROCEDURE Job Card RG 011 4 of 6

- The CEL threshold is set between the two levels (normally at 64 lux).Monitor settings are adjusted at the lower level of ambient light (normally below 64 lux); CEL settings are adjusted at the higher level of ambient light.

1. Adjustment at Lower Ambient Light (CEL OFF)

   Set the room lighting conditions to obtain the required lower level of ambient light; check that the CEL LED is off.

   Carry out the checks and adjustments described below:

   a. Check Ambient Light Conditions

   - Place a white reflecting screen (GE Medical Systems Part No. 45 066 988) on the front of the monitor and measure Light Level LA in the center of the screen: the typical value should be 3 to 10 cd/m^2.

   b. Check Reflected Light

   - Switch off the monitor and remove the power connector. Measure Light Level LP at the center of the screen: (LP/LA is about 0.1).
   - If reflections of room lights appear on the screen, the customer should be asked to change the position of the monitor.

   c. Monitor Brightness Setting

   - For Digital systems, set the system to a Black Image and measure the Luminance LO at the center of the screen.
   - For Analog systems, measure Luminance LO obtained during a totally black fluoro exposure (Manual Mode, generator HV OFF, mA min, kV min, 2 mm Cu filter).
   - Adjust the Monitor Brightness control to obtain: $1.3 \times \frac{LA}{10} < LO < 2 \times \frac{LA}{10}$

   d. Monitor Contrast Setting

   - For Digital systems only, present the density test pattern and set it to Level F or 100% and measure Luminance LB at the center of the screen: adjust the Monitor Contrast setting to obtain:
     (60 LO<LB < 100 LO)
   - For Analog Systems only, measure Nominal Luminance LN obtained during a nominal fluoro exposure (Automatic Mode, 2 mm Cu filter, mA adjusted to give 75 kV); adjust the Monitor Contrast setting to obtain:
     LN > 8 x LO (a good value should be between 2 x LA and 3 x LA).
   - Check that the black level has not changed (LO). Otherwise return to Para 1.c.

BRIGHTNESS/CONTRAST ADJUSTMENTS GENERAL PROCEDURE Job Card RG 011 5 of 6

e. CEL Threshold Adjustment

Adjust the CEL threshold control (Ill. 1, Item 4) (turn it counter-clockwise) to switch on the CEL LED DS 1 (Ill. 1, Item 1), then turn it clockwise until the CEL LED DS1 is just extinguished.

2. Adjustments at Higher Ambient Light (CEL ON)

Set the room lighting conditions to obtain the required higher level of ambient light; check that the CEL LED is on, DS1 (ILL. 1, Item 1).

Carry out the checks and adjustments described below (as described under 2 – 5 – 1, but using the appropriate CEL controls and values):

a. Check Ambient Light Conditions.

- Place a gray reference card (GE Medical Systems Part No. 2110 360) on the front of the monitor and measure Light Level LA in the center of the screen.

b. Check Reflected Light.

- If reflections of room lights appear on the screen, the customer should be asked to change the position of the monitor.

c. Monitor Brightness Setting.

- For Digital systems, set the system to a Black Image and measure Luminance LO at the center of the screen.
- For Analog systems, measure Luminance LO obtained during a totally black fluoro exposure (Manual Mode, generator OFF or mA min, kV min, 2 mm Cu filter).
- Adjust the CEL Brightness R108 (Ill. 1, Item 2) control to obtain:

$$1.3 \times \frac{LA}{10} < LO < 2 \times \frac{LA}{10}$$

d. Monitor Contrast Setting.

- For Digital systems only, present the density test pattern, set it to Level F or 100% and measure the Luminance LB at the center of the screen. Adjust the CEL Contrast setting to obtain:

  60 LO < LB < 100 LO.

Note: LB must never exceed < 220 cd/m .

- For Analog systems only, measure Nominal Luminance LN obtained during a nominal fluoro exposure (Automatic Mode, 2 mm Cu filter, mA adjusted to give 75 kV); adjust the CEL Contrast R107 (Ill. 1, Item 3) setting to obtain:
- LN > 8 x LO (a good value should be between 2 x LA and 3 x LA).
- Check that each white area is less than 220 cd/m .

BRIGHTNESS/CONTRAST ADJUSTMENTS GENERAL PROCEDURE Job Card RG 011 6 of 6

3. Cel Pot Adjustments.

   The CEL BRIGHTNESS, CONTRAST and THRESHOLD pots have been factory – set for "typical" room lighting conditions. If satisfactory tracking of room light cannot be attained in the room where the monitor is installed, the CEL BRIGHTNESS and CEL CONTRAST pots may be re – adjusted by following the steps of PART 2 below. PART 1 of this procedure must be done first. When making the following adjustments, do not obstruct or shade the light paths to the CEL light sensor.

   a. Set room lights for "low – light" condition and adjust CEL THRESHOLD to just extinguish the LED located just above the pot. Set room lights for "high – light" conditions. CEL LED should be turned on.

   b. With room lights at "high – light" condition, set the CEL CONTRAST pot fully CCW. Adjust CEL BRIGHTNESS pot to just visualize the blanked portion of the monitor raster. For R&F rooms, it may be preferable to set this pot to just visualize the collimator blades.

   c. Observe the lung field, and set the CEL CONTRAST pot so that the image is a bright as is it can be with the penetrameter features discernable and the mesh in clear focus.

   d. Re – adjust the CEL BRIGHTNESS pot, is necessary, to just visualize blanking as described in Procedure 6 above.

15" and 20" DISTAR-M MONITORS Job Card RG 012

Purpose: BRIGHTNESS/CONTRAST ADJUSTMENTS FOR VASCULAR AND CARDIAC APPLICATIONS - 15" CONSOLE MONITOR	Version No.: 2 Date: May/20/98
Time:	Personel: 1

SECTION 1
SUPPLIES REQUIRED

- None.

SECTION 2
TOOLS REQUIRED

- Standard tool kit.
- Luminance meter.
- Gray reference card.
- 2 mm Cu.

SECTION 3
SAFETY PRECAUTIONS

- None.

SECTION 4
PREREQUISITES

- None.

SECTION 5
TASK DESCRIPTION

5.1 Extended Procedure
Console Monitor Adjustment for Distar Monitor in Vascular Room

5.1.1 Description

The good perception of all the details of a radiological image on a monitor depends mainly on the observation conditions and the right operating conditions of the monitor versus the dynamic range of the video signal.

It is also very important for the user that the image on monitor match the image on film as much as possible, that means those both dynamic ranges should be as much as possible the same.

This procedure helps to measure the observation conditions and adjust the operating conditions.

5.1.2 When to perform this Procedure

The monitor is the final component on the video chain; and its main contribution to Image Quality is often forgotten.

We recommend to perform this procedure each time the customer is not perfectly satisfied with its image quality, or each time you could believe some adjustments has changed in the monitor or each time the image on monitor does not correspond correctly to the image on film (hard – copy camera).

5.1.3 Tools required

- Luminance meter (recommended model: Minolta LS100),
- Calibrated gray reference surface (R_G is often 18%) with known reflection ratio R_G, Part Number 2110360.

5.2 Procedure

5.2.1 Set – Up

- Boot – Up DLX Application Software:
- The console monitor must be positioned on the desk at the same place it is in working condition; verify especially:
  - the monitor positioning,
  - the distance between monitor and user.
- The room lighting must be the same as in working conditions; verify the conditions:
  - Artificial lighting (fluorescent, incandescent lighting),
  - Adjustment of variable lighting,
  - If there is a natural lighting, verify if it could be the main lighting (curtains or door opening, meteorological conditions).

In this last case, this procedure is not useful because it is impossible to guarantee good performance with an ambient light which is not stable and which intensity is generally very high.

BRIGHTNESS/CONTRAST ADJUSTMENTS FOR VASCULAR AND CARDIAC APPLICATIONS - 15" CONSOLE MONITOR

Job Card RG 012

Note: **In vascular or cardiac rooms, it is specially interesting to have a low level of lighting to get a good contrast in the blacks and to allow to get a high dynamic range between blacks and highlights.**

- Position the luminance meter at the same place the user's eyes are, or at the minimum focalisation distance of the luminance meter.

5.2.2 Procedure

Note 1: **Do not move the monitor during the whole procedure!**

1. Reference Luminance (L_R)

   a. Position the gray reference surface roughly centered on the monitor screen with the gray surface towards the luminancemeter.

   b. Measure the reflected light on the gray surface center: L_G.

   c. Calculate the reference luminance: $L_R = L_G/R_G$.

Note 2: R_G is the reflection ratio of the gray surface; this surface shall be clear with no fingerprints.

Note 3: The measurement can be repeated on the whole surface, so the ratio between the higher and lower values shall not be more than 2. It could occur when some spot light illuminates the monitor screen. If it occurs, modify the monitor position or room lighting conditions in agreement with the user.

   d. Calculate the ambient illumination: $I_A : L_R$ x p:
   I_A is correct only if the gray surface has a lambertian response, so I_A, shall be between 10 and 30 lux, and never above 50 lux.

   e. Record L_R and I_A on data sheet.

   f. Remove the gray surface from the monitor.

2. Luminance of the Switched – off Phosphore (L_P)

   a. Power off the monitor, for example by removing its power plug.

   b. Measure the phosphor luminance (L_P) on the screen center, that means the ambient light diffused by the screen (see Notc 3 abovc).

This measure concerns only the light which is diffused by the phosphor, but not the reflection (as a mirror) of light on the CRT glass. If there are very visible reflection, they MUST be suppressed by modifying the lighting (suppressing, switching off or moving the lights) or by moving the monitor (position, orientation).

   c. Calculate the monitor screen reflection ratio: $R_M = L_P/L_R$

Note 4: RM is a feature of the monitor, it should be less than 9% for a Distar monitor.

   d. Power on the monitor and wait some minutes before any other measurement because of the stabilization time of the monitor.

BRIGHTNESS/CONTRAST ADJUSTMENTS FOR VASCULAR AND CARDIAC APPLICATIONS - 15" CONSOLE MONITOR

Job Card RG 012

3. Luminance at Zero Dose (L_0) and at Maximum Level (L_{MAX})

   a. Display the SMPTE pattern on the monitor. Verify the DLX brightness and contrast window is resetted to the default value by depressing the appropriate button on the DLX keypad.

   b. Adjust the monitor brightness button so that the 5% square (smaller square inside the % square) is just visible inside the 0% square: its level is just above that of 0% square.

   c. From the DLX browser menu, choose a patient, exam, sequence image which has not too much contrast: there should be no fully black or white areas.

   d. Turn brightness and contrast buttons on the DLX keypad fully CCW: you should obtain a completely black image with no white pixels, if not, redo step 3.

   e. Measure the luminance (Lo) of the black level with the luminance meter, Illustration 1 gives the relation between monitor luminances in cd/m and ambiant light in lux; adjust Lo with the monitor brightness button to the recommended value according to previously measured ambiant light IA. For example, if IA = 30 lux, Lo should be equal to 0,95 cd/m .

   f. Turn brightness button on the DLX keypad fully CW: the image should be completly white, with no black pixel; if not, redo steps 3 and 4.

   g. Measure the luminance (Lmax) of the white level with the luminance – meter; refer to Illustration 1 to know the recommended value for Lmax according to previously measured ambiant light IA. Adjust Lmax with the monitor contrast button to this recommended value. For example, if IA=30 Lo, Lmax should be equal to 190 cd/m.

   h. Repeat steps 4 to 8 until you obtain Lo and Lmax equal to the recommended values. Record them on data sheet.

   i. Record Lo and Lmax on data sheet.

Note 5: It is extremely important to take care of these adjustments: the image on the monitor should be as similar as possible to the image on the film. While the dynamic range on the film is very big (optical densities are more than 2.5 above base+fog and that corresponds to a ratio Lmax/Lo more than 300), it is very difficult to achieve this goal without having Lmax too high so that the monitor dazzles. So the only way to tend towards this goal is to decrease Lo, so to decrease ambiant light to the minimum acceptable by the user.

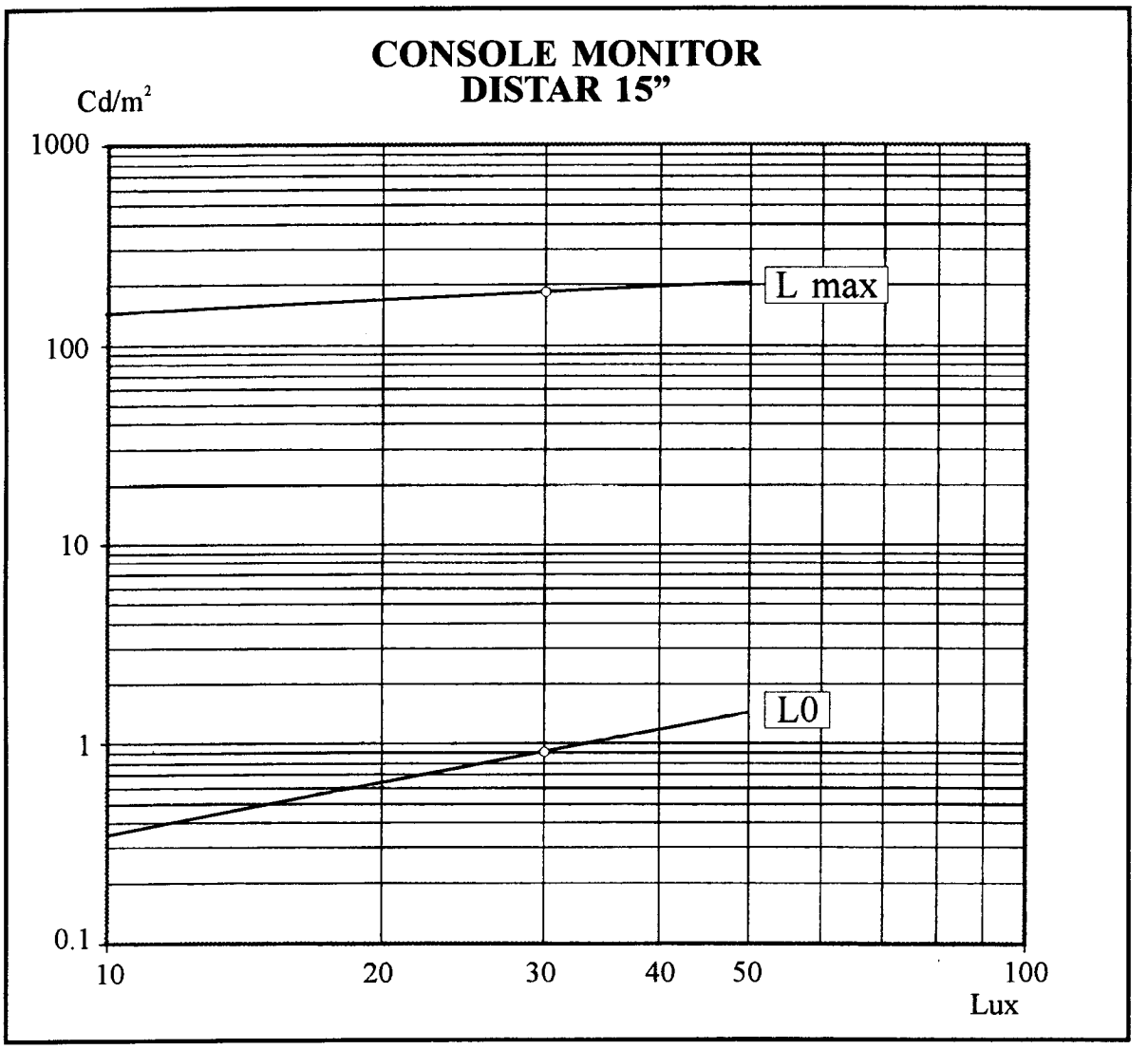
Note 6: Lo should be within Lp X 1.1 and Lp X 1.3 to keep the maximum luminance dynamic range. Lmax may be slighly different from recommended values, but not too low to avoid reducing luminance dynamic range, and not too high to avoid dazzling the user's eyes.

BRIGHTNESS/CONTRAST ADJUSTMENTS FOR VASCULAR AND CARDIAC APPLICATIONS - 15" CONSOLE MONITOR

Job Card RG 012

5 of 5

ILLUSTRATION 1



15" and 20" DISTAR-M MONITORS Job Card RG 013

Purpose: BRIGHTNESS/CONTRAST ADJUSTMENTS FOR VASCULAR AND CARDIAC APPLICATIONS - 20" ROOM MONITOR	Version No.: 2 Date: May/20/98
Time:	Personel: 1

SECTION 1
SUPPLIES REQUIRED

- None.

SECTION 2
TOOLS REQUIRED

- Standard tool kit.
- Luminance meter.
- Gray reference card.
- 2 mm Cu.

SECTION 3
SAFETY PRECAUTIONS

- None.

SECTION 4
PREREQUISITES

- None.

SECTION 5
TASK DESCRIPTION

5.1 Extended Procedure

5.1.1 Description

The good perception of all the details of a radiological image on a monitor depends mainly on the observation conditions and the right operating conditions of the monitor versus the dynamic range of the video signal.

This procedure helps to measure the observation conditions and adjust the operating conditions.

5.1.2 When to perform this Procedure

The monitor is the final component on the video chain; and its main contribution to Image Quality is often forgotten.

We recommended to perform this procedure each time the customer is not perfectly satisfied with its image quality, or each time you could believe some adjustments has changed in the monitor.

5.1.3 Tools required

- Luminance meter (recommended model: Minolta LS100) + stand.
- Calibrated gray reference surface (R_G is often 18%) with known reflection ratio R_G.
- 2 x 0.8 mm Cu or 2 x 1 mm Cu.

5.2 Procedure

5.2.1 Set–Up

- Boot – Up Advantx Application Software and make the following selections on the Advantx Console:
  - VASCULAR or CARDIAC,
  - DLX Fluoro,
  - 75 kVp,
  - Manual mA at minimum.
- Select the Technical Menu on DLX.
- The positioner, tabletop, and room monitor must be positioned in the room at the same place they are in working condition; verify especially:
  - Monitor positioning,
  - Height versus floor,
  - Tilt,
  - Direction toward the user.
- The room lighting must be the same as in working conditions; verify the conditions (during fluoro if there is an automatic switching of some lights):
  - Artificial lighting (fluorescent, incandescent lighting),
  - Adjustment of variable lighting,
  - If there is a natural lighting, verify if it could be the main lighting (curtains or door opening, meteorological conditions).

CAUTION

In this case, this procedure is not useful because it is impossible to guarantee good performance with a room ambient light which is not stable and which intensity is generally very high.

BRIGHTNESS/CONTRAST ADJUSTMENTS FOR VASCULAR AND CARDIAC APPLICATIONS - 20" ROOM MONITOR

Job Card RG 013

Note: **In vascular or cardiac rooms, it is specially interesting to have a low level of lighting to get a good contrast in the blacks, but the physician needs an enough lighter area on the patient, where he introduces his catheter.**
So, it is recommended to have a directional light like a spot, which makes a lighter area with a diameter of some decimeters (for example 2 to 5).

- Position the luminancemeter (if possible on its stand, which can stand on the table top) at about the same height and position the physician eyes are in working conditions (near the table top). In that case, the monitor screen shall be between 1.1 and 1.9 meter for a high line rate, and twice this distance for a low line rate.

5.2.2 Procedure

Note 1: **Do not move the monitor during the whole procedure!**

1. Reference Luminance (L_R)
   a. Position the gray reference surface roughly centered on the monitor screen with the gray surface towards the luminancemeter.
   b. Measure the reflected light on the gray surface center: L_G.
   c. Calculate the reference luminance: $L_R = L_G/LR_G$

Note 2: RG is the reflection ratio of the gray surface; this surface shall be clear with no fingerprints.

Note 3: The measurement can be repeated on the whole surface, so the ratio between the higher and lower values shall not be more than 2. It could occur when some spot light illuminates the monitor screen. If it occurs, modify the monitor position or room lighting conditions in agreement with the user.

   d. Calculate the ambient illumination: I_A:L_R x p:
   I_A, is correct only if the gray surface has a lambertian response, so I_A shall be between 10 and 50 lux.
   e. Record L_R and I_A on data sheet.
   f. Remove the gray surface from the monitor.

2. Luminance of the Switched – off Phosphore (L_P)
   a. Power off the monitor, for example by removing its power plug.
   b. Measure the phosphor luminance (L_P) on the screen center, that means the ambient light diffused by the screen (see Note 3 above).

This measure concerns only the light which is diffused by the phosphor, but not the reflection (as a mirror) of light on the CRT glass. If there are very visible reflection, they MUST be suppressed by modifying the lighting (suppressing, switching off or moving the lights) or by moving the monitor (position, tilt).

   c. Calculate the monitor screen reflection ratio: $R_M = L_P/L_R$

Note 4: R_M is a feature of the monitor, it should be less than 10% for a Distar monitor.

BRIGHTNESS/CONTRAST ADJUSTMENTS FOR VASCULAR AND CARDIAC APPLICATIONS - 20" ROOM MONITOR

Job Card RG 013

d. Power on the monitor and wait some minutes before any other measurement because of the stabilization time of the monitor.

3. Luminance at Zero Dose (L_0) and at Maximum Level (L_{MAX})

a. Close fully the collimator blades and put a strong filtration in the X – ray beam (for example lead shirt the II entrance plane).

b. Do a short fluoro (1 to 2 s) at manual and minimum mA. Release the fluoro footswitch.

Note 5: In DLX Technical Menu, the LIH function stores the last fluoro image, so it is not necessary to do fluoro during all the measurement.

c. Measure the luminance at zero dose (or black level), L_0 on the screen center.

d. Adjust the monitor brightness knob to obtain: $L_0 = L_P \times K$ with:
K = 1.5 for vascular or K = 2 for cardiac.

e. Select the gray 15 (255 LSB) on the DLX Technical Menu and display it.

f. Measure the maximum luminance (L_{MAX}) on the screen center.

g. Adjust the monitor contrast knob to obtain: $L_{MAX} = L_0 \times 150$, or, if L_0 is less than 1 cd/m, adjust $L_{MAX} = G \times 150$ with G = 1.5 for vascular and 2 for cardiac.

h. Repeat steps 2 to 7 you have L_0 and L_{MAX} equal to the calculated values.

Note 6: L_{MAX} can vary between $L_0 \times 120$ and L0 x 180 (or G x 120 and G x 180), but must not exceed 360 cd/m; if that occurs, readjust L0 at a smaller value between $L_P \times 1.2$ and $L_P \times 1.5$.

i. Record L_0 and L_{MAX} on data sheet.

j. Open the collimator blades and remove the filtration from the X – ray beam.

4. Luminance at Nominal dose (L_N)

a. Place the copper filtration in the X – ray beam.

b. Do DLX fluoro in automatic (regulated) mode.

c. Measure the luminance (L_N) on the screen center.

Note 7: If the lighting conditions are good and the monitor has been correctly adjusted, L_N should be between 30 and 40 cd/m2.
If it is not the case, then there might be a misadjustment of video gains.

d. Record L_N on data sheet.

15" and 20" DISTAR-M MONITORS Job Card RG 014

Purpose: **BRIGHTNESS/CONTRAST ALTERNATIVE PROCEDURE WITHOUT LUMINANCEMETER**	Version No.: 2 Date: May/20/98
Time:	Personel: 1

SECTION 1
SUPPLIES REQUIRED

- None.

SECTION 2
TOOLS REQUIRED

- Standard tool kit.

SECTION 3
SAFETY PRECAUTIONS

- None.

SECTION 4
PREREQUISITES

- None.

SECTION 5
TASK DESCRIPTION

5.1 Distar Monitor Set-up Theory

There are two practical limits to an image displayed on a CRT monitor. One limiting factor is variable, and is established by the amount of ambient light in the environment surrounding the display. The amount ambient light reflected from the surface of the display limits how dark "black" areas of the image may appear. The BRIGHTNESS control is used to compensate for this limitation.

The other limiting factor is fixed, and relates to how bright you can make "white" areas of an image without degrading perceived image clarity. Here, the displayed image is limited by the physics of CRT technology. The phosphor on the inside surface of the CRT screen can "saturate" or "bloom" if it is driven too hard, and the effect is like using a blunt crayon to draw a picture, as opposed to a sharp pencil. The CONTRAST control must be set with an understanding of this limitation, to avoid overdriving the phosphor.

The range of CRT output between the dark and bright limits is called the contrast ratio. The BRIGHTNESS and CONTRAST should be set to achieve the highest overall contrast ratio possible over a range of room light conditions.

A photocell is used in the Distar monitor to compensate for changes in room lighting by adjusting the CRT output. This sensor automatically increases the monitor BRIGHTNESS and CONTRAST as the room light increases. Unfortunately, the practical range of control by the sensor is limited by the saturation point of the CRT phosphor, as described above. Therefore, unless it is properly calibrated, the automatic sensor cannot compensate for large increases in room light without pushing the CRT beyond the phosphor saturation limit. The objective of the Distar set – up procedure is to find the optimum monitor settings which take full advantage of the available contrast ratio without allowing the phosphor to be overdriven.

5.2 Customer Preferences (of displayed images)

Since the BRIGHTNESS and CONTRAST controls on Distar are not easily accessible, it is important to align them to a setting which will please a majority of users. The set up procedure represents a good compromise between an ideal (infinite) contrast ratio, and the real – world limitations of the display. Even so, it may be necessary to deviate from these settings to please the customer.

Generally speaking, there are two categories of customer applications: cardiac/vascular and R&F. Cardiac/vascular users seem to prefer more overall brightness, so that detail is not lost in dark areas of the image. They are typically looking at small arteries and guide wires, and want to see detail across all shades of grey. R&F users seem to prefer higher contrast, even at the risk of losing image detail in dark areas. They are usually looking at broader parts of anatomy, and want sharp contrast with defined edges. It is important to get final approval of the monitor settings from actual users at each installation.

5.3 Definitions used in the Procedure

Room Light Conditions:

- Low – light: room light dimmed to lowest level for fluoro or other imaging mode.
- High – light: full or maximum room illumination under any circumstances.

Input Signal Conditions (typical values):

- A calibrated X – ray system will provide 1V p – p of terminated video, including 300 mV of sync, 50 mV of black – level setup and 650 mV of black – to – white video.

5.4 Adjustments

There are five adjustments used to set up the Distar monitor, located behind the rear door. To simplify Distar alignment, three of the adjustments have been pre – set at the factory to accommodate "typical" room lighting conditions where the Distar may be installed. If the Distar is installed in a room with an abnormal lighting situation, site adjustments of all five controls may be necessary. The five adjustments, and their functions, are described as follows:

- Site adjustments:
  - BRIGHTNESS knob:
    sets baseline for darkest areas of the displayed image. Set at low – light conditions so that blanked monitor raster is just visible.

- CONTRAST knob:
  sets limit for brightest areas of the displayed image. Set at low-light conditions for sufficient (but not maximum) brightness of white areas.

- Factory pre – set adjustments:
  - CEL THRESHOLD post:
    establishes a minimum level of ambient light above which the photocell becomes active, to compensate for changes in room lighting. Set at low – light conditions so that the LED (located above the pot) just extinguishes.
  - CEL BRIGHTNESS pot:
    adjusts how accurately the photocell increases the monitor brightness to compensate for a change in room light. Set at high – light condition so that blanked monitor raster is just visible, and detail is visible in the darkest areas of the image.
  - CEL CONTRAST pot:
    adjusts the amount of increase in image contrast for a given increase in room light. Set at high – light condition for brightest image with detail still visible in the brightest areas of the image.

5.5 Brightness and Contrast Settings

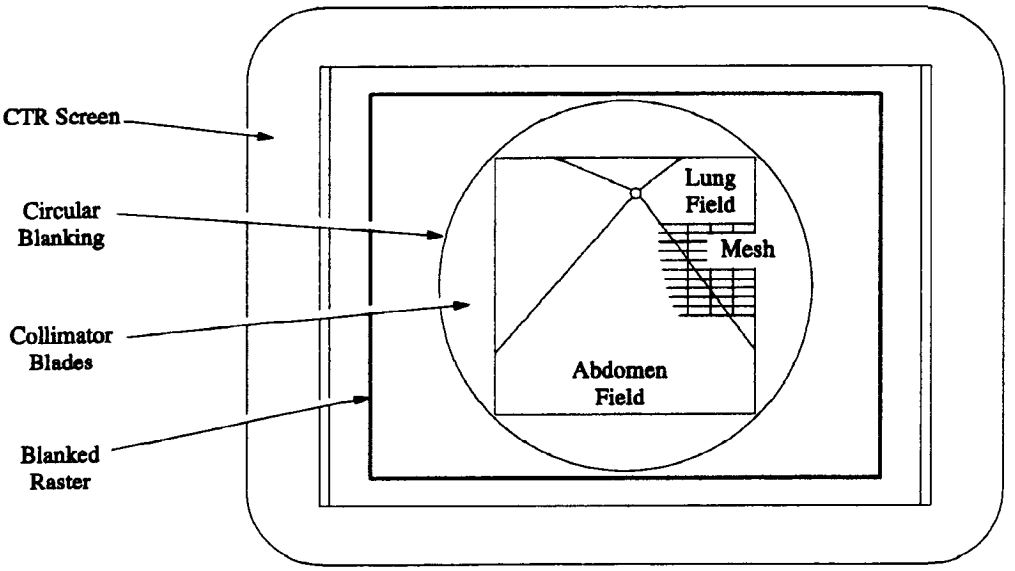
This procedure describes a method for setting the BRIGHTNESS and CONTRAST knobs for baseline performance. Final settings should be based on known customer preference.

1.Fluoro a CV phantom with a screen (#20 mesh) covering part of the lung field. Select 6" field of view. Locate the apex of the CV phantom near the top of the image, with the abdomen field covering the central part of the image. Set the X – ray system for "auto brightness" mode, with 80 kV applied. Be sure that circular blanking is turned on.
Bring in the collimator blades until the displayed image is a square with the corners just touching the perimeter of the circle.

BRIGHTNESS/CONTRAST ALTERNATIVE PROCEDURE WITHOUT LUMINANCEMETER Job Card RG 014 4 of 5

ILLUSTRATION 1
MONITOR SCREEN

CV PHANTOM DISPLAYED IMAGE



2. Set room lights for "Low – Light". Set CONTRAST knob fully CCW. Adjust the BRIGHTNESS knob to just visualize the blanked portion of the monitor raster (just outside the perimeter of circular blanking). In some R&F rooms, it may be preferable to just visualize the collimator blades.
3. Observe the lung field, and set the CONTRAST knob for a sufficient brightness level. The penetrameter features should remain discernable with the mesh in clear focus. The CONTRAST should not be set close to the point where the mesh begins to become unclear.
4. Re-adjust BRIGHTNESS knob, if necessary, to just visualize blanking (or the collimator blades) as described in Procedure 2 above.
5. Set room lights to "High – light". Verify that the mesh is still in clear focus. Reduce CONTRAST if necessary.

BRIGHTNESS/CONTRAST ALTERNATIVE PROCEDURE WITHOUT LUMINANCEMETER

Job Card RG 014

5.6 Cell Pot Adjustments

The CELL BRIGHTNESS, CONTRAST and THRESHOLD pots have been factory – set for "typical" room lighting conditions. If satisfactory tracking of room light cannot be attained in the room where the monitor is installed, the CELL BRIGHTNESS and CELL CONTRAST pots may be re – adjusted by following the steps of PART 2 below. PART 1 of this procedure must be done first. When making the following adjustments, do not obstruct or shade the light paths to the CELL light sensor.

1. Set room lights for "low – light" condition and adjust CELL T SHOULD to just extinguish the LED located just above the pot. Set room lights for "high – light" conditions. CELL LED should be turned on.
2. With room lights at "high – light" condition, set the CELL CONTRAST pot fully CAW. Adjust CELL BRIGHTNESS pot to just visualize the blanked portion of the monitor rasher. For R&F rooms, it may be preferable to set this pot to just visualize the collimator blades.
3. Observe the lung field, and set the CELL CONTRAST pot so that the image is a bright as is it can be with the pentameter features discernible and the mesh in clear focus.
4. Re–adjust the CELL BRIGHTNESS pot, is necessary, to just visualize blanking as described in Procedure 6 above.

15" and 20" DISTAR-M MONITORS Job Card RG 015

Purpose: **DISTAR MONITOR ADJUSTMENT FOR DLX SYSTEM**	Version No.: 2 Date: May/20/98
Time:	Personel: 1

SECTION 1
SUPPLIES REQUIRED

- None.

SECTION 2
TOOLS REQUIRED

- F351 luminance meter Model # 22514 and associated fiber optic probe from Image Evaluation Tool (IET) kit 46 – 232388G2.
- Illuminance Meter Kit 46 – 262762G1 or 62 Model # 22514E.

Note: If the illuminance meter kit (46 – 262762G1 or G2) is not available, complete Section 4 and proceed to Section 6.

SECTION 3
SAFETY PRECAUTIONS

- None.

SECTION 4
PREREQUISITES

1. Boot the DLX Application Software.
2. Select Patient.
3. Select Technical Menu.
4. Select Patterns.
5. Select 512 Square and leave the SMPTE pattern displayed on the monitor.
6. Check that the DLX brightness and contrast window is reset to the default values by pressing the appropriate DLX keypad button.
7. Position the monitor to the working conditions that it will be used under. Check:

- Monitor position;
- Monitor's angle to the user;
- Distance between the monitor and the user.

DISTAR MONITOR ADJUSTMENT FOR DLX SYSTEM Job Card RG 015 2 of 5

8. Determine the Minimum, Typical, and Maximum ambient light levels at which the images are viewed. The Typical room lighting should be the same as under normal working conditions. Recommended for Typical light level is 1 to 2 footcandles (10.76 to 21.53 lux), not to exceed 5 footcandles (53.82 lux).

Note: Monitors should always be adjusted with regard to actual measured ambient light. However, if the illuminance meter kit (46 – 262762G1 or G2) is not available, complete Section AUCUN LIEN as much as possible, and proceed to Section 6.

9. If the fluoro footswitch is connected to a light dimmer, find a way to have the lights dimmed during the adjustment procedure. Check:

- The artificial lighting(fluorescent, incandescent lighting);
- The adjustment of variable lighting;
- If there is natural lighting, and if it is the main lighting (curtains or door openings, meteorological conditions).

CAUTION

If there is natural lighting, this procedure can not be totally accurate. It is impossible to ensure good performance with ambient light which is not stable, and in which intensity is generally very high.

Do not move the monitor during this procedure.

SECTION 5
TASK DESCRIPTION

Note: Monitors should always be adjusted with regard to actual measured ambient light. However, if the illuminance meter kit (46 – 262762G1 or G2) is not available, complete Section AUCUN LIEN and then proceed to Section 6.

5.1 Monitor Brightness and Contrast Adjustment

1. Power up the monitor for several minutes to allow it to stabilize.
2. Set the ambient light to the Minimum viewing level.
3. Put tapc over the monitor light sensor (CEL)(see Illustration 1).

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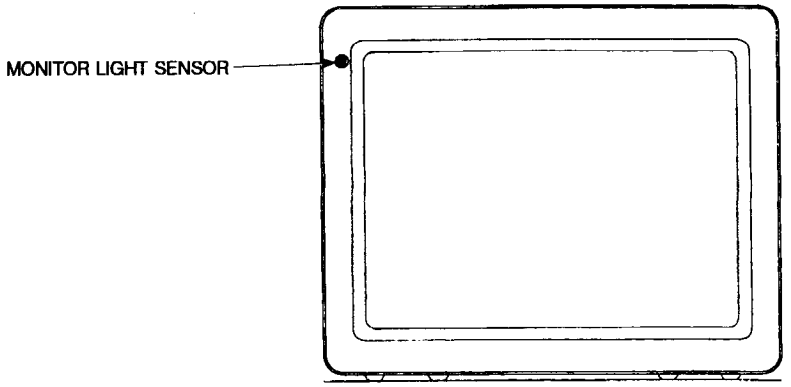
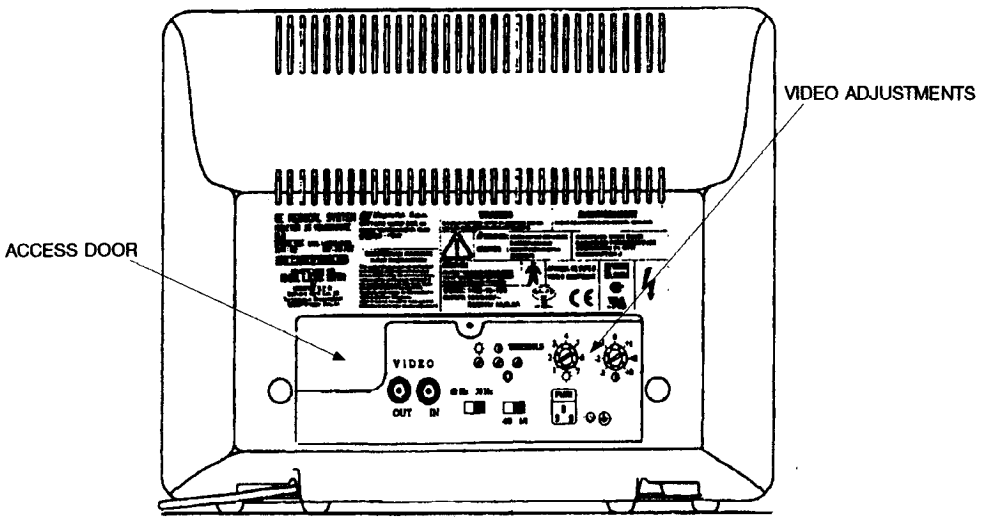
ILLUSTRATION 1
MONITOR LIGHT SENSOR



Note: The CEL must not be activated during this part of the setup.

4. Remove the access door at the back of the monitor (see Illustration 2).

ILLUSTRATION 2
BACK OF MONITOR, DOOR REMOVED



Note: The CEL Threshold LED is activated when lit (see Illustration 3).

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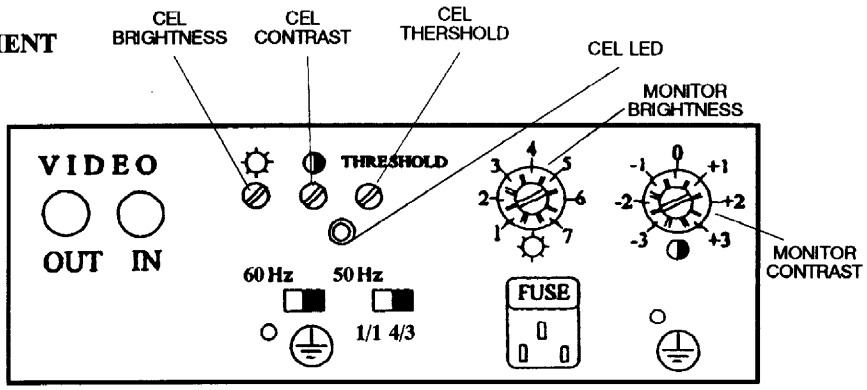
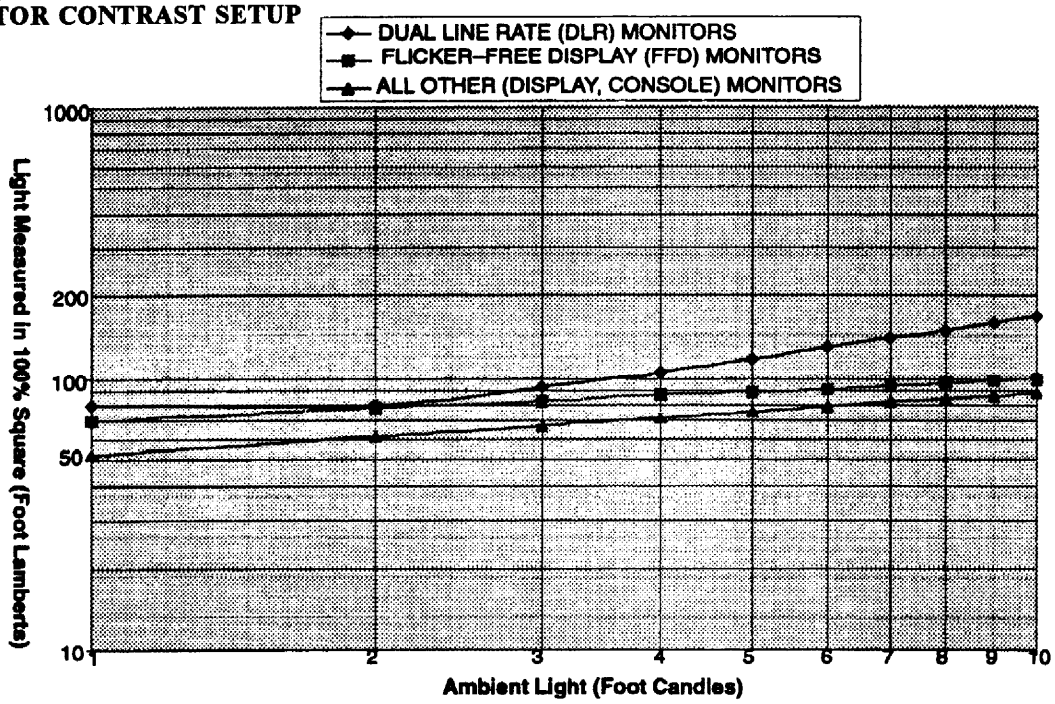
ILLUSTRATION 3
VIDEO ADJUSTMENT



5. Initially set the MONITOR CONTRAST to fully clockwise & MONITOR BRIGHTNESS to fully counterclockwise (see Illustration 3).
6. Set the MONITOR BRIGHTNESS knob such that the 5% square is just visible in the black square.
7. Measure the brightness in the 100% square using the IET light meter.
8. Adjust the MONITOR CONTRAST so that the light in the 100% square equals the value in Illustration 4 for the 1 to 2 footcandle (10.76 to 21,53 lux) ambient light range.

ILLUSTRATION 4
MONITOR CONTRAST SETUP



DISTAR MONITOR ADJUSTMENT FOR DLX SYSTEM

Job Card RG 015

The setup for the console monitor is critical since it is used for filming images and must match the brightness and contrast levels on the film.

9. Repeat Steps 6., 7. and 8. until the 5% and 100% squares are equal to their recommended values.
10. Remove the tape over the CEL.

5.2 CEL Threshold Adjustment

1. Place the Illuminance Meter Kit (46 – 262762G2) probe next to the CEL. Ensure that the probe does not block ambient light going to the CEL.
2. Adjust the ambient light in the room such that the light meter reads 2 footcandles (21.53 lux) for Dual Line Rate (DLR) monitors and 1 footcandle (10.76 lux) for all other monitors.
3. Adjust the CEL THRESHOLD potentiometer (see Illustration 3) such that the CEL LED just turns on.

5.3 CEL Contrast Adjustment

1. Set the room lighting conditions to the Maximum operating range.
2. Measure the level of ambient light in the room.
3. Measure the brightness in the 100% square using the IET light meter
4. Adjust the CEL CONTRAST potentiometer to the recommended value (see Illustration 4). Some increase in the black levels may be noted.

Note: The CEL Brightness is not a part of this procedure.

5. Set the room lighting conditions to the Typical operating range.
6. Adjust the MONITOR BRIGHTNESS such that the 5% square is just visible.